UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

Engineering & Construction Innovations, Inc.,

Plaintiff,

v.

Bradshaw Construction Corporation and Travelers Casualty & Surety Company of America,

Defendants,

and

Bradshaw Construction Corporation,

Counter Claimant,

v.

Engineering & Construction Innovations, Inc.; Fidelity and Deposit Company of Maryland; and Zurich American Insurance Company,

Counter Defendants.

File No. 20-cv-808 (ECT/TNL)

FINDINGS OF FACT AND CONCLUSIONS OF LAW

Plaintiff Engineering & Construction Innovations, Inc. ("ECI") was the general contractor on a construction project for the City of Minneapolis (the "City"). The goal of the project was to run a transmission water main under the Mississippi River. ECI hired Bradshaw Construction Corporation ("Bradshaw") to tunnel underneath the river with a microtunnel boring machine. A lot went wrong. Before Bradshaw started tunneling, the

project was behind schedule. After Bradshaw started tunneling the launch shaft flooded twice. Then Bradshaw's machine got stuck. ECI fired Bradshaw and completed the tunnel itself with a second microtunnel boring machine. After reaching the retrieval shaft, ECI's machine got stuck too. In the end, the project was completed behind schedule by more than 500 days.

ECI claims Bradshaw breached the contract by failing to perform, seeks contractual indemnity under the Subcontract, and maintains a bond claim against Bradshaw's surety, Defendant Travelers Casualty & Surety Company of America. Bradshaw brings claims for wrongful termination, breach of warranty, and prompt payment (under a Minnesota statute), and maintains its own bond claim against ECI's sureties, Fidelity and Deposit Company of Maryland and Zurich American Insurance Company.

A bench trial was held over seven days. Nine witnesses testified for ECI, and ten witnesses testified for Bradshaw, as follows:

ECI Witnesses	**Role**
Robb Johnson	Vice President of ECI in 2019
Sam Umlauf	ECI Project Manager
Robbie Marshall	ECI Site Superintendent
Kyle Anderson	SEH Resident Project Representative
Adam Markos	Black & Veatch Project Manager
Cary Hirner	Black & Veatch Tunnel Practice Lead
Peter Pfister	Professional Engineer / Project Manager, City of Minneapolis
Mark Gentry	Expert witness
Dr. Arthur ("AJ") McGinn	Expert witness

Bradshaw's Witnesses	**Role**
Eric Eisold	Executive Vice President
Stephen Malm	Microtunneling Operator
George Britton	Superintendent
Roger Lewis	Superintendent
Michael Wanhatalo	Project Manager
Bradley Short	General Superintendent
Dr. Kimberly Staheli	Expert witness
Donald Bergman, Jr.	Expert witness
Joseph Egan	Expert witness
Lester M. Bradshaw, Jr.	President

Based on the following Findings of Fact and Conclusions of Law, I find for ECI on its contract and indemnity claims and for Bradshaw on its prompt-payment claim. Several issues remain to be decided, and the entry of final judgment will await resolution of those issues.

FINDINGS OF FACT[1]

The 10th Avenue Water Main River Crossing Project[2]

1. The 10th Avenue Bridge spans the Mississippi River, connecting the East Bank and the West Bank of the University of Minnesota campus. *See* Tr. 62:15–20 (Johnson).

2. In 2018 to 2019, the City was undertaking a project to renovate the 10th Avenue Bridge. In connection with that renovation, the City's Public Works Department assessed a water main that had been installed and suspended from the bottom of the bridge in the 1940s. The City decided to replace the water main and began to evaluate replacing the suspended water main with a water main running underneath the river. Tr. 867:19–869:4 (Pfister).

---

[1] Footnotes included within the Findings of Fact are explanatory only. They are not findings. "P-#" Exhibits are ECI's trial exhibits. "D-#" Exhibits are Bradshaw's trial exhibits. "J-#" Exhibits are joint trial exhibits. For trial exhibits, cited page numbers refer to the offering party's stamped exhibit page numbering, unless otherwise specified. Trial Transcripts ("Tr.") are docketed at ECF Nos. 508 (vol. 1, pp. 1–154), 509 (vol. 2, pp. 156–440), 510 (vol. 3, pp. 441–791), 511 (vol. 4, pp. 792–1094), 512 (vol. 5, pp. 1095–1428), 513 (vol. 6, pp. 1429–1728), 514 (vol. 7, pp. 1729–1879) and are paginated consecutively throughout those seven volumes. Trial Transcripts will be cited by transcript page number, lines, and the testifying witness's identity. Mr. Bradshaw will be identified as "Lester" to avoid confusion between the person and the company.

[2] Bradshaw filed a motion to correct mistakes in the record under Federal Rule of Civil Procedure 60(a). ECF No. 523. "The court may correct a clerical mistake . . . whenever one is found in a judgment, order, or other part of the record." Fed. R. Civ. P. 60(a). ECI does not oppose the motion. I have reviewed the requested corrections and conclude the identified mistakes in the trial record are clerical errors. Bradshaw's motion will be granted.

3. The Public Works Department solicited proposals for engineering and design services for a water main crossing under the 10th Avenue Bridge. Tr. 867:6–23 (Pfister).

4. The water main at issue is important to the City's distribution system, a system that covers fifty-five square miles of the City of Minneapolis and supplies water to suburban customers, including Bloomington, Crystal, New Hope, the Mall of America, and the Minneapolis–St. Paul Airport. The 48-inch water main, one of the City's large transmission water mains, is one of only seven water mains that crosses the Mississippi River. Tr. 869:7–870:12, 872:7–10 (Pfister).

5. The City must be judicious about taking a transmission water main out of service because it causes a loss of water pressure and redundancy. This implicates health, safety, and welfare concerns, such as maintaining water pressure for firefighting. Tr. 870:15–873:9 (Pfister).

6. Timing was also important because there was a future Minnesota Department of Transportation bridge reconstruction project that would involve taking down the Third Avenue water main. The City needed to have the 10th Avenue Bridge water main back online before shutting down the Third Avenue water main. Tr. 874:22–23, 900:21–901:5, 929:17–930:7 (Pfister).

7. The work associated with constructing the underground tunnel and moving the water main underground is formally called the 10th Avenue Water Main River Crossing Project (the "Project"). J-1 (Project Manual).

8. The City engaged Black & Veatch, Inc. to design the Project and to serve as engineer-of-record. Tr. 47:1–13 (Johnson); Tr. 647:1–3 (Markos); Tr. 704:8–13 (Hirner).

9. As engineer-of-record, Black & Veatch was responsible for the design of the Project, including conducting the geotechnical investigation regarding subsurface conditions at the site, preparing associated geotechnical reports, selecting appropriate construction methodologies, and putting together plans and specifications for the Project. Tr. 704:16–24 (Hirner).

10. Black & Veatch is a well-known engineering company with over 10,000 employees and offices all over the world. Tr. 47:17–18 (Johnson); Tr. 693:20–23, 694:3–5 (Hirner).

11. Black & Veatch has a civil works division that is involved in tunneling, dams, pipelines, and pump stations. At the time of trial, Black & Veatch's civil works department was engaged in construction projects valued in the billions of dollars. Tr. 694:10–17 (Hirner).

12. Black & Veatch assigned Cary Hirner, P.E. as Lead Tunnel Engineer. Mr. Hirner was responsible for leading the team that developed the design for the crossing, including the shafts and the microtunneling operation. Tr. 705:4–10 (Hirner).

The Project Documents

13. The Project Manual governed work on the Project. It contains several relevant documents, including the General Conditions, Supplementary Conditions, the Geotechnical Data Report ("Data Report"), and the Geotechnical Baseline Report

("Baseline Report").[3] Tr. 44:3–10 (Johnson); J-1 at 4–6 (Project Manual Table of Contents); J-2 (Baseline Report); J-3 (Data Report).

The General Conditions

14. The Project's General Conditions lay out the terms of the contractor's relationship with the City. Everything needed to "properly administer" the contract was included in the General Conditions. Tr. 51:4–15 (Johnson); P-1 (General Conditions).

15. The contract documents—including the General Conditions, Supplementary Conditions, Data Report and Baseline Report—are complementary, meaning that "what is required by one is as binding as if required by all." P-1 § 3.01(A). "It is the intent of the Contract Documents to describe a functionally complete project . . . to be constructed in accordance with the Contract Documents." *Id.* § 3.01(B); Tr. 51:19–24 (Johnson).

16. "The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order." P-1 § 11.01(A). These terms are defined as follows:

a. "*Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract." P-1 § 1.01(A)(8).

b. "*Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by

[3] The "Supplementary Conditions" were sometimes referred to as the "Special Conditions." Tr. 57:14–15 (Johnson).

Engineer, ordering an addition, deletion, or revision in the Work." P-1 § 1.01(A)(48).

c. "*Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times." P-1 § 1.01(A)(21).

17. The contract price and times may only be changed by a Change Order. P-1 §§ 11.04(A), 11.05(A). As the procedure is described in § 11.06: "Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price . . . or seek other relief under the Contract." *Id.* § 11.06(A).

The Geotechnical Data Report

18. Black and Veatch prepared a Data Report dated November 8, 2018. J-3 (Data Report).

19. The Data Report "presents a summary of the geotechnical investigation, subsurface conditions, geotechnical data, and laboratory test results for the City of Minneapolis' Tunneled Water Main under the Mississippi River Project. . . . A subsurface investigation was conducted at the shaft sites form April 2018 through June 2018 and in the Mississippi River in September 2018." J-3 § 1.0; *see also* Tr. 53:21–54:5 (Johnson) (describing the Data Report as including all the historical subsurface data gathered for the Project).

20. The purpose of the Data Report is described as follows:

> This [Data Report] provides the geologic background from literature searches and information derived from the field

> exploration and laboratory testing programs for the shafts and microtunnel on this project.
>
> The technical concepts, terms, and descriptions in this [Data Report] follow standards commonly used in geotechnical engineering and engineering geology professions, which have a specific meaning pertaining to the work. Contractors invited to submit bids should have a qualified geotechnical engineer or qualified engineering geologist carefully review this [Data Report] so that a complete understanding of the information presented herein is developed prior to submitting a bid.
>
> The [Data Report] presents the factual details of the geotechnical field investigations completed at the project site. Any recommendations of soil, rock, and groundwater parameters are not a part of the scope of the [Data Report]. This [Data Report] is a Contract Document.

J-3 § 1.2; *see also* Tr. 54:6–14 (Johnson); Tr. 719:7–15 (Hirner).

21. In preparing the Data Report, Black & Veatch conducted a subsurface investigation that included drilling six boreholes, installing two piezometers,[4] and utilizing four geoprobe drills, as well as laboratory testing the soil and rock. Tr. 716:21–717:5, 722:11–725:25 (Hirner). Black & Veatch also conducted a literature search for boreholes along the Mississippi River Valley in the vicinity of the Project site, including dozens of prior borings taken near the Project site from 1939 to 2010. Tr. 717:8–12, 727:22–728:19 (Hirner).

22. Section 2.3.1 of the Data Report describes the influence of the Mississippi River on the geology along the Project's tunnel alignment. Tr. 720:7–14 (Hirner).

---

[4] A piezometer is defined as, "an instrument for measuring pressure or compressibility; *esp*: one for measuring the change of pressure of a material subjected to hydrostatic pressure." *Piezometer*, Merriam-Webster's Collegiate Dictionary (11th ed. 2003).

The Geotechnical Baseline Report

23. Black & Veatch also prepared a Baseline Report dated November 8, 2018. J-2 (Baseline Report).

24. The Baseline Report "describes the geotechnical conditions that can be assumed during bidding and construction of the shaft and microtunneling portions of the Tunneled Water Main under the Mississippi River Project in Minneapolis, Minnesota." J-2 § 1.0; *see also* J-4 § 5.03(C)(3) ("The [Baseline Report] describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations . . . .").

25. The Baseline Report "establishes a contractual statement of the subsurface conditions, referred to as the baseline conditions." J-2 § 1.1. The purpose of the Baseline Report is to:

> Set baselines for geotechnical conditions and material behavior that can be assumed to be encountered during construction.
>
> Identify important design and construction considerations, key project constraints, and selected requirements to be addressed by contractors during bid preparation and construction.
>
> Provide guidance to Owner and their representatives in administrating the Contract.

Id.; *see also* Tr. 54:21–55:9 (Johnson).

26. The Baseline Report "translate[s] the results of the geotechnical investigation . . . into clear, definitive, and verifiable descriptions of subsurface conditions upon which the Contractor may rely." J-2 § 1.1. By establishing these baselines, the Baseline Report

"establishes the allocation of risk between Contractor and Owner for the actual conditions encountered." *Id.*

27. "If there are any inconsistencies between the [Baseline Report] and the [Data Report], the [Baseline Report] shall take precedence." *Id.* § 1.2.

28. As described in the Baseline Report, bedrock at the Project site "consists predominantly of the St. Peter Sandstone." *Id.* § 5.1.4.[5] " "St. Peter Sandstone is a buff to white, uncemented to moderately cemented, fine-grained sandstone with some iron straining." *Id.* St. Peter Sandstone is "extremely weak" to "weak" and "samples can be broken by hand." *Id.* "Shale seams and bands approximately 2-feet thick occur in deeper portions of the St. Peter Formation." *Id.* "[T]he uncemented and poorly cemented sandstone will act like unconsolidated dense sand when excavated and will want to flow into the shaft excavation, and against the MTBM and steel pipe when tunneling." *Id.* § 8.1.1.

29. Section 8.1.2 of the Baseline Report addresses groundwater inflow in the tunneling alignment. *Id.* § 8.1.2. Table 8-2 provides baseline flow rate values at the heading:

Table 8-2 Tunnel Groundwater Inflow Baseline Values

Scenario	Flow Rate (gpm) At Heading
Steady State	50
Flush Flow	200

[5] Bedrock is "just sound rock located below soils and weathered rock." Tr. 721:24–722:2 (Hirner); *see also bedrock*, The American Heritage Desk Dictionary (5th ed. 2012) ("The solid rock that underlies the loose surface material of the earth.").

J-2 at 18 tbl.8-2.

30. The Baseline Report does not address tunnel voids or karstic conditions. *See* J-2. "A karstic condition is one where there's essentially been a hole develop in a rock formation." Tr. 764:20–25 (Hirner); *see also* Tr. 1499:6–10 (Staheli) ("A karstic material is a material that has solution cavities in it. They can be very big like caves. They can be small. They just wind through.").

The Supplementary Conditions

31. The Supplementary Conditions "amend and supplement" the General Conditions. J-4 (Supplementary Conditions) at 1; *see also* Tr. 52:9–13 (Johnson). The Supplementary Conditions supersede the General Conditions when the two documents are inconsistent. J-4 § 3.01(F).

32. The Supplementary Conditions define the work to be performed under the contract documents. J-4 at 1. Most relevant here, "[c]onstruction of approximately 940 linear feet of 48 [inch] water main under the Mississippi River using microtunneling methods." *Id.*

33. The Supplementary Conditions state that "[n]either Owner, Engineer, nor any geotechnical or other consultant warrants or guarantees that actual subsurface conditions will be as described in the [Baseline Report], nor is the [Baseline Report] intended to warrant or guarantee the use of specific means or methods of construction." *Id.* § 5.03(C)(6).

34. The Supplementary Conditions also require contractors to promptly report differing subsurface conditions. The Supplementary Conditions describe when a

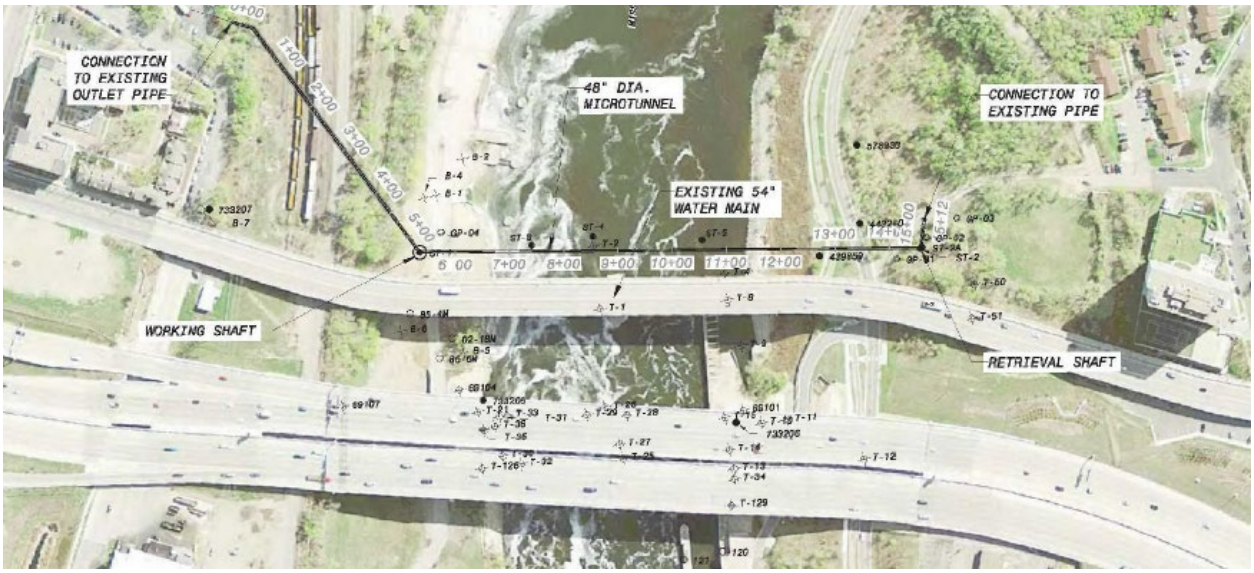
subsurface condition that is uncovered or revealed is considered a differing subsurface condition. *Id.* For example, if a subsurface condition "differs materially from conditions shown or indicated in the [Baseline Report]." *Id.* § 5.04(A)(1). Upon becoming aware of a differing subsurface condition, the contractor shall promptly "notify Owner and Engineer in writing about such condition no later than three (3) days after the first observance of such condition." *Id.* § 5.04(A). If a contractor fails "to give the written notice as required by [Section 5.04(A)]," then the contractor "shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to [that] subsurface or physical condition." *Id.* § 5.04(D)(2)(c).

The Microtunneling Specifications

35. Based on its subsurface investigation, Black & Veatch determined that vertical watertight launch and retrieval shafts would be constructed and a microtunnel would be used to get from the launch shaft to the retrieval shaft. Tr. 729:3–11 (Hirner).

36. Microtunneling was selected by Black & Veatch because the uncemented St. Peter Sandstone behaves like sand and tends to collapse when disturbed. Tr. 729:12–18 (Hirner).

37. The picture below shows an aerial view of the Project site, including I-35W, the University of Minnesota's main campus (the "East Bank"), and the University of Minnesota's west-bank campus (the "West Bank"). Tr. 62:4–20 (Johnson). The picture is marked with the launch shaft (called the working shaft in the photo) on the left, a black line representing where the steel microtunnel casing will run underneath the Mississippi River, and the retrieval shaft on the right.



J-3 at(Figure 1) 22; J-2 at 10 (cross-section schematic).

38. Microtunneling is a trenchless method of tunnel construction in which a remote control microtunneling boring machine ("MTBM") is used to bore underground and lead casing pipe from a launch shaft to a retrieval shaft. J-5 at 2–3; Tr. 1066:7–16 (Eisold). Typically, another pipe, such as a water main, will be placed within the casing pipe for installation. *See* Tr. 955:13–17 (Gentry).

39. Slurry microtunneling, a form of pressurized microtunneling, was specified for this Project. J-5 at 1. In slurry microtunneling, the MTBM uses slurry that enters the machine through piping. *Id.* at 3; 1066:9–1067:1 (Eisold). The slurry is then introduced under pressure to stabilize the face of the MTBM and to mix with material excavated by the rotating cutterhead, otherwise known as spoils. J-5 at 3; 1066:9–1067:1, 1069:10–18 (Eisold). The slurry—mixed with the spoils—is then transported by a slurry pumping system to a separation plant. 1066:9–1067:1 (Eisold); Tr. 706:24–707:7 (Hirner). Once

the spoils have been removed at the separation plant, the clean slurry goes back down through the piping to collect more spoils. Tr. 1066:9–1067:1 (Eisold).

40. Slurry is a fluid or lubricant that removes material excavated by the cutterhead. *See* Tr. 1066:9–1067:1 (Eisold). Slurry can be water, water-bentonite, or have other polymers or additives. Tr. 707:8–12 (Hirner).

41. The cutterhead is a rotating component of the MTBM that excavates the ground. Tr. 715:3–8 (Hirner). The cutterhead is slightly larger than the MTBM and the pipe behind the machine which creates an annular space—sometimes referred to as the annulus. Tr. 714:24–715:8, 831:1–8 (Hirner).

42. The MTBM advances through a form of pipe jacking. Tr. 1066:9–16. (Eisold). A jacking frame slowly pushes the casing behind the MTBM to propel the machine forward. Tr. 1068:16–19 (Eisold). Once the MTBM (and trailing pipe casing) has advanced far enough into the ground, the hydraulic jack is retracted, and the next section of pipe casing is lowered into the shaft and connected. *See* D-417 (photo of jacking frame); D-418 (photo of MTBM partially advanced); D-397 (photo of a section of casing pipe being lowered into launch shaft).

43. The Project's microtunneling specifications provide parameters, but the "Contractor is solely responsible for the performance of the equipment and means and methods selected for construction." J-5 § 3-3.

The City Hires ECI as the Project's General Contractor

44. ECI is a heavy civil construction firm that performs water resource work, dam and hydro work, underground shaft/tunnel work, rehabilitation and infrastructure work, and geotechnical work. Tr. 38:22–39:3 (Johnson).

45. Since its incorporation twenty-five years ago, ECI has worked primarily in the five-state Upper Midwest region. Tr. 39:11–17 (Johnson). ECI serves as the general contractor on roughly seventy percent of its work, but also serves as subcontractor in some of its specialty work, such as geotechnical work. Tr. 40:15–19 (Johnson).

46. Over the past ten years, ECI has performed work for municipalities and governments, including the City of St. Paul, the City of Minneapolis, the Metropolitan Council, as well as agencies such as the Army Corps of Engineers and the Bureau of Land Reclamation. Tr. 41:1–11 (Johnson).

47. In November 2018, the City issued a public advertisement to replace the 10th Avenue water main, relocating it from the bridge to under the Mississippi River. Tr. 41:19–42:8 (Johnson); *see also* J-1 at 7.

48. The bidding documents consisted of instructions to bidders, the General Conditions, the Supplemental Conditions, plans, specifications, the Baseline Report, the Data Report, and addenda. Tr. 43:3–8 (Johnson); *see also* J-1.

49. ECI submitted a bid to work on the Project as a general contractor. ECI's Vice President (now President) Robb Johnson reviewed the bidding documents and led ECI's bid team. Tr. 42:15–22, 43:9–11 (Johnson).

50. The City received two bids for the Project. *See* J-6 at 18. Because ECI's bid was lower, *see id.* at 17–18, ECI was awarded the prime contract for the Project. *Id.*; *see also* Tr. 44:11–12 (Johnson).

51. ECI and the City executed a prime contract pursuant to which ECI agreed to provide all the labor, materials, equipment, and incidentals for the 10th Avenue Water Main Crossing Project in exchange for a lump-sum payment of $15,599,725.00. Tr. 44:13–45:8 (Johnson); *see also* J-6 ¶ 1 (Prime Contract).

ECI Hires Bradshaw as its Microtunneling Subcontractor

52. As the general contractor, ECI was authorized to retain subcontractors to perform certain parts of the work on the Project. P-1 § 7.06(A)–(B).

53. ECI sought to retain a subcontractor to perform the microtunneling work on the Project. *See* Tr. 57:16–58:9 (Johnson).

54. Bradshaw is a tunnel construction specialist. Tr. 1646:1–5 (Lester). Bradshaw began microtunneling in 1991 and has performed well over 100 microtunneling projects over the last thirty years. Tr. 1646:20–1647:1 (Lester). For the last twenty years sixty to eighty percent of Bradshaw's work has been in slurry microtunneling. Bradshaw performs work throughout the country. Tr. 1646:1–10 (Lester); Tr. 1071:3–5 (Eisold). Prior to this Project, Bradshaw had never failed to finish a project, nor had it ever been terminated for cause. 16471647:9–14 (.Lester).

55. Bradshaw receives notice of potential projects and bids. Tr. 1070:23–1071:2, 1071:16–1072:10 (Eisold). In January 2019, Bradshaw submitted a successful bid for the Project's microtunneling scope of work to ECI. Tr. 58:5–11 (Johnson); D-427.

56. When Bradshaw submitted its bid, it was required to "[a]gree, at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times and in accordance with the other terms and conditions of the Bidding Documents." J-1 at 12 § 3.1.7.

57. Based on Bradshaw's bid, ECI and Bradshaw entered a subcontract. Tr. 58:10–23 (Johnson); J-7 (the Subcontract Agreement).

The Subcontract

58. Under the Subcontract, Bradshaw agreed "to provide all labor, materials, services, and equipment to perform the following scope of work on the Project: Install 60″ steel Casing via Microtunneling." J-7 at 1. The forty-eight-inch water main would then be installed inside the sixty-inch steel casing. *See* Tr. 191:3–6 (Johnson).

59. ECI agreed to pay Bradshaw $2,611,481.25 in exchange for Bradshaw completing its microtunneling scope of work. J-7 at 1.

60. Bradshaw also assumed toward ECI all the duties and obligations that ECI, under the prime contract, assumed toward the City. J-7 ¶ 4.

61. The Subcontract contemplated that Bradshaw would begin its work on September 2, 2019, with an anticipated microtunneling completion date of November 22, 2019. J-7 at 1 (schedule). Notwithstanding this anticipated schedule, Bradshaw would "begin Work when Contractor directs within 2 calendar days after Contractor's written notice to proceed." J-7 ¶ 2(a).

62. Several terms in the Subcontract are relevant to the Parties' dispute. First, is a site-deficiency clause:

> Site Deficiencies. If any part of the Subcontract Work depends upon another's work at the Project Site, Subcontractor shall inspect and promptly report to Contractor delays, deficiencies or apparent defects in the other's work or jobsite conditions, and may request a Change. Subcontractor's failure to inspect and promptly report objections to another's work shall constitute acceptance of that work as fit and proper.

J-7 ¶ 4(i).

63. Second, is an indemnification clause; Bradshaw agreed to defend, indemnify and hold harmless ECI and the City from claims arising, in relevant part, from:

> *Subcontractor Acts*. Intentional or reckless misconduct, omissions, or negligent acts by Subcontractor or its agents, employees, subcontractors and others for whom Subcontractor is responsible.
>
> . . .
>
> *Liquidated Damage*. Any other liability to Owner or Contractor that Subcontractor caused including Liquidated Damages.

J-7 ¶ 6; *see also id.* ¶ 2(c) ("Subcontractor will be responsible for the portion of such liquidated damages caused by Subcontractor's delayed or deficient work pursuant to the Indemnifications paragraph . . . .").

64. Third, as relevant here, the Subcontract dictates when and how Bradshaw could be terminated:

> Contractor may terminate or suspend Subcontractor's Work, all or in part . . . upon Subcontractor's material breach . . . . Subcontractor shall be in material breach if, after five (5) days' written notice, Subcontractor . . . (e) unreasonably fails to

> complete or proceed with Work per schedule; (f) tells Contractor that it will not perform . . . .

J-7 ¶ 9.

65. "Upon breach, Contractor may finish the Work, replace or re-perform any defective Work; and charge to Subcontract any cost to complete, correct or becomes owed to Owner, plus damages from delay or disruption, plus liquidated or actual damages caused by Subcontractor's breach." *Id.*

66. Fourth, is a list of inclusions and exclusions attached to the Subcontract. J-7 at 8–9. Excluded from Bradshaw's scope of work is the construction of the concrete launch eye, also known as the headwall, and the concrete thrust block. *Id.* at 9.

67. "No modification of [the Subcontract] is effective unless written and signed by both Parties." *Id.* ¶ 12.

68. The Subcontract required Bradshaw to procure a performance bond. J-7 at 2. On September 24, 2019, Bradshaw's surety, Defendant Travelers Casualty and Surety Company of America ("Travelers"), issued a performance bond in the amount of $2,651,532.80 on behalf of Bradshaw (as principal) and in favor of ECI (as obligee). D-76 (Performance Bond).[6]

ECI Begins Work on the Project

69. ECI began its work on the Project in April 2019. Tr. 61:10 (Johnson).

[6] Bradshaw and Travelers have stipulated that Bradshaw was performing work under the Subcontract between Bradshaw and ECI. ECF No. 473 ¶ 1.

70. ECI's Project team consisted of Robb Johnson as Project Executive, Sam Umlauf as Project Manager, Dave Street as Construction Manager, Robbie Marshall as Site Superintendent, and various laborers and foremen working under Mr. Marshall. Tr. 45:24–46:5 (Johnson).

71. Short Elliott Hendrickson, Inc. ("SEH") was contracted by Black & Veatch to serve as the on-site inspecting engineer for the Project. Tr. 515:10–12 (Anderson); Tr. 49:5–11 (Johnson). As the inspecting engineer, SEH served as "the eyes and ears of the City." Tr. 49:5–11 (Johnson).

72. SEH assigned Kyle Anderson to be the on-site inspector. Tr. 49:19–50:1 (Johnson). Mr. Anderson, who was housed in a project trailer located on the Project site, would look at the site daily and record his observations. Tr. 514:22–515:4, 522:9–21 (Anderson). He kept a daily diary of his observations and took photographs of the Project site. Tr. 514:22–515:4, 516:16–23, 517:3–518:3 (Anderson).

73. Anderson attended weekly project meetings that were hosted in his project trailer. Tr. 519:2–19 (Anderson). ECI provided an agenda on ECI letterhead and Anderson would take notes on the agenda. Tr. 519:16–19, 519:23–520:15 (Anderson). He would record in writing what various participants said at the meetings underneath the bullet-pointed agenda item. Tr. 520:44–521:15 (Anderson).

74. During the summer of 2019, ECI performed some demolition work to move the existing water main and infrastructure. Tr. 65:24–66:15 (Johnson). It also began excavation of the launch and retrieval shafts. Tr. 67:11–4 (Johnson).

75. The Project Manual specified three approved methods of shaft construction: drilled steel casing, *see* J-1 at 425–27; secant pile wall, *see id.* at 427–31; and slurry diaphragm wall, *see id.* at 431–35.

76. Space constraints at the Project site made it impractical to construct a launch shaft using any of the three specified methods, so ECI—with approval from the City and Black & Veatch—selected ground-freezing and shotcrete as its method of shaft construction. Tr. 232:5–234:4 (Johnson); 825:25–826:11 (Hirner). Shotcrete is a method of spraying concrete using compressed air. Tr. 419:14–23 (Marshall).

Launch Shaft Design

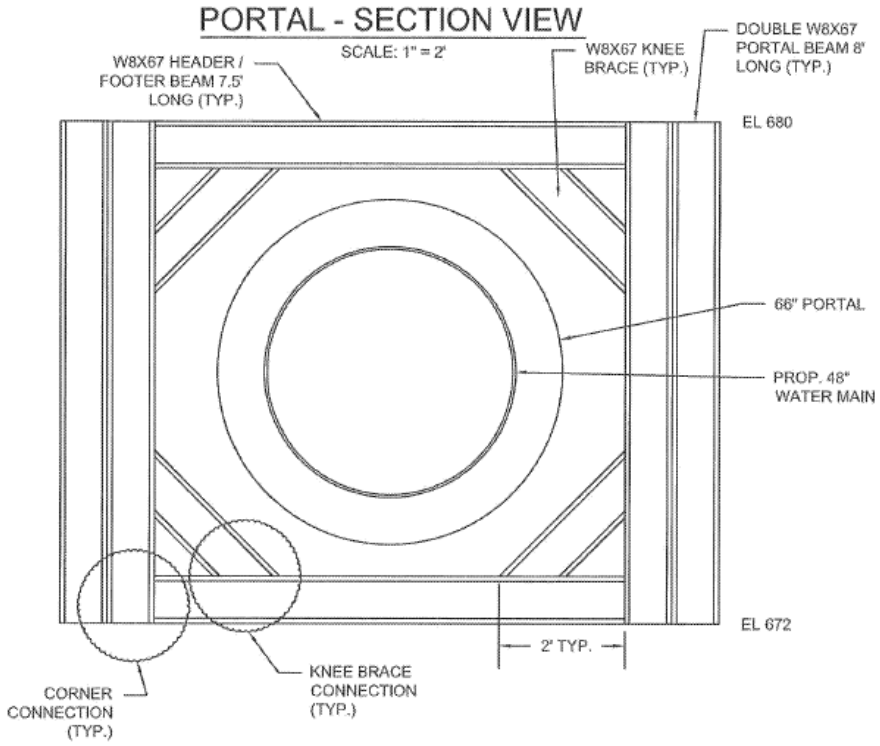
77. ECI engaged FK Engineering Associates ("FKE") to design a temporary earth retention system ("("TERS")") liner and base slab. D-433 at 1.

78. FKE's design consisted of a shotcrete wall that was reinforced with welded wire fabric and steel lattice girders. D-433 at 3. Additional features of the design included a shotcrete bottom plug, a reaction block, and a steel portal in the shaft wall (to allow for tunneling operations). *Id.* at 3–7.

a. A "lattice girder" (sometimes called a "ring girder") is a steel support for the shaft liner installed around the circumference of the launch shaft. *See* Tr. 297:24–298:7 (Johnson); 418:10–12 (Marshall).

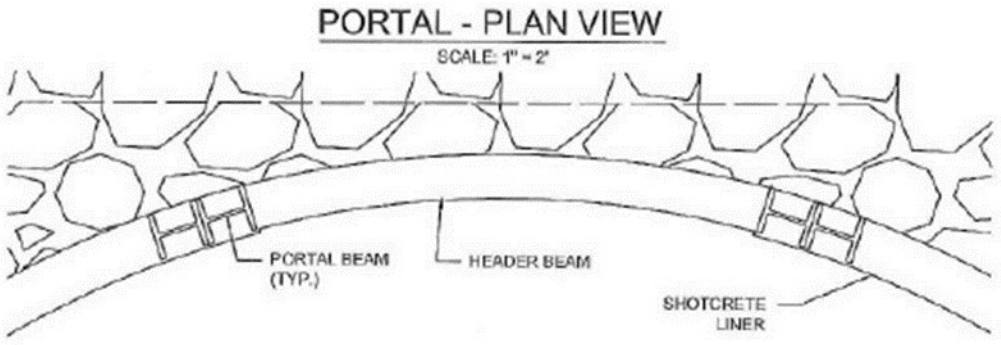
b. "Welded wire fabric" is steel wire mesh, welded into panels of four-inch-by-four-inch squares, and installed between sets of lattice girders. Tr. 446:20–22, 447:14–448:5 (Marshall).

c. The steel portal (also called the portal steel) consisted of vertical and horizontal steel beams around the launch portal, as shown in this "straight on" view:



D-432 at 2.

d. According to FKE's design, the steel portal was to be flush with the launch-shaft wall, as can be seen in this "looking down" view:



D-432 at 2.

79. The FKE drawings include a ten-step construction procedure. *See* D-432 at 1. Most relevant here is step seven: "install portal in shotcrete liner per drawings." *Id.*

80. FKE's design also specifies "9 [inch] thick shotcrete liner in rock." *Id.* When FKE sent its drawings to ECI, it also provided supporting calculations and seventeen pages of handwritten notes. *See* D-433 at 7–23. Sheet No. 6(B) in FKE's handwritten notes includes two sentences stating: "Lattice girders are installed at four inches off-center. So, cut one girder." *Id.* at 14 (cleaned up).

81. As part of ECI's review, it looked at the FKE drawings and requirements for submittal of the contract. Tr. 236:8–20 (Johnson). ECI also verified FKE's calculations. *Id.* Johnson reviewed, signed, and stamped FKE's drawings as a licensed professional engineer in the State of Minnesota. Tr. 234:22–235:7, 235:20–236:7 (Johnson).

ECI Builds the Launch Shaft

82. ECI hired a company called SoilFreeze to design and operate a ground-freeze system in the area where the launch shaft would be constructed. Tr. 67:23–68:5, 230:19–231:1 (Johnson).

83. ECI drilled and installed a series of steel freeze pipes in a pattern that SoilFreeze specified. Tr. 230:19–231:1, 244:25–245:9 (Johnson). A chilled brine then circulated through the freeze pipes, removing heat from the ground and, over time, creating a large mass of frozen ground that could be excavated. Tr. 68:14–24 (Johnson); *see also* Tr. 1773:14–1774:5 (McGinn).

84. With the ground frozen, ECI excavated and constructed the launch shaft using a top-down method. Tr. 68:14–16 (Johnson); Tr. 416:16–21 (Marshall). As ECI mined the frozen sandstone and excavated down, ECI constructed a shaft liner composed of shotcrete reinforced with metal. Tr. 417:6–13 (Marshall).

85. Once the metal reinforcements—lattice girders and welded wire fabric—were installed, ECI applied shotcrete to the walls. *Id.*

86. The internal diameter of the launch shaft was thirty feet. *See* Tr. 64:23–65:6 (Johnson). And the depth was roughly seventy feet. J-2 at 9–10; Tr. 138:8–1313 (Johnson).

87. To excavate the shaft, ECI mined down "five, six feet at a time" and then installed a lattice girder around the circumference of the shaft. Tr. 418:5–12 (Marshall).

88. With the lattice girder set around the circumference of the shaft, ECI then overmined additional ground outside the lattice girder, leaving an excavated space so that ECI could apply the designated thickness of shotcrete. Tr. 417:20–419:2 (Marshall). To ensure that enough ground had been overmined to an appropriate horizontal depth behind the lattice girders, ECI used plumb bobs hung from the surface as a measuring device. *Id.*[7]

89. ECI then sprayed concrete around and behind the lattice girders and welded wire fabric, in the area that had been overmined. Tr. 417:6–13 (Marshall).

---

[7] A plumb bob is "the metal bob of a plumb line." *Plumb bob*, Merriam-Webster's Collegiate Dictionary (11th ed. 2003). A plumb line is "a line (as of cord) that has at one end a weigh (as a plumb bob) and is used esp. to determine verticality." *Plumb line*, Merriam-Webster's Collegiate Dictionary (11th ed. 2003).

90. The photograph below shows ECI applying shotcrete to the shaft wall according to this top-down method:

D-407; *see also* Tr. 419:24–420:3 (Marshall) (discussing D-407).

91. The photograph below depicts the launch shaft at a later stage of ECI's excavation. It shows frozen sandstone at the bottom of the shaft with reinforced shotcrete lining the shaft walls (and exposed lattice girders and welded wire fabric at the bottom):

D-361; *see also* Tr. 416:22–417:5 (Marshall) (discussing D-361).

92. From the ground surface down the first thirty feet of the launch shaft, the shotcrete was applied six to eight inches thick. Tr. 422:22–24 (Marshall). From that point down to the concrete slab at the bottom of the launch shaft—also called the concrete plug—the shotcrete was applied ten to twelve inches thick. Tr. 422:24–423:2 (Marshall). Every ECI worker who applied shotcrete was properly certified, having passed both a written test and a physical test for shotcrete application. Tr. 420:4–421:11 (Marshall).

Bradshaw Arrives at the Project Site

93. Although the original estimated start date for Bradshaw's work was September 2, 2019, J-7 at 1, the Project was behind schedule in September, Tr. 67:5–6 (Johnson).

94. Michael Wanhatalo, Bradshaw's project manager, and Brad Short, Bradshaw's superintendent, visited the Project site shortly after Labor Day. Tr. 1414:18–

20 (Short). Mr. Wanhatalo worked out of Bradshaw's main office in Maryland but was on site every two to three weeks. Tr. 1302:13–24 (Wanhatalo). Mr. Short was responsible for day-to-day operations. Tr. 1409:17–1410:2 (Short).

95. Bradshaw's crew then arrived on September 30, 2019. *See* D-454 at 1.

96. After arriving, Bradshaw's crew prepared the site and mobilized its materials and equipment. Tr. 331:22–332:1 (Umlauf); Tr. 525:2–10 (Anderson); Tr. 1415:4–8 (Short).

97. ECI and Bradshaw were in regular communication about the status of the Project, both in weekly progress meetings but also in the field. Tr. 332:2–7, 336:14–22 (Umlauf); Tr. 425:20–426:8 (Marshall).

98. Bradshaw was concerned about the delay in starting to microtunnel. On October 22, Mr. Wanhatalo conveyed these concerns to Mr. Umlauf by email. P-372. If delays continued past November 4, Mr. Wanhatalo told ECI that Bradshaw would "either need to pull out and complete another project (approximate 2 month duration which would me[an] we would be back in Spring), or we would need to be paid a delay rate." *Id.*; *see also* Tr. 330:1–331:6 (Umlauf). A part of Bradshaw's concern was being subjected to more challenging winter conditions. Tr. 1086:10–1087:3 (Eisold); Tr. 1308:7–10 (Wanhatalo).

99. Around this time, Mr. Short likewise expressed concerns to Mr. Marshall about the delay in Bradshaw taking control of the shaft to begin its microtunneling scope of work. Tr. 426:9–13 (Marshall).

Bradshaw and ECI Personnel Discuss Construction of the Headwall

100. The parties fiercely dispute what happened next.

101. Mr. Marshall testified that he met with Mr. Short in ECI's job trailer to discuss Mr. Short's concerns. Tr. 426:14–19 (Marshall). According to Mr. Marshall, Mr. Short suggested that Bradshaw could construct the headwall and thrust block—work Bradshaw had performed many times before. Tr. 426:20–427:2, 427:13–17 (Marshall). That would allow Bradshaw personnel to set up its microtunneling equipment while other Bradshaw personnel constructed the headwall and thrust block, rather than waiting until after ECI completed the launch shaft to begin settings up its microtunneling equipment. Tr. 427:3–12 (Marshall).

102. Mr. Marshall was "thrilled" about Mr. Short's proposal, and he promptly relayed that proposal to ECI's project manager, Mr. Umlauf. Tr. 427:18–428:8 (Marshall).

103. Mr. Umlauf testified that he and Mr. Wanhatalo discussed Bradshaw constructing the thrust block and the headwall, which would enable Bradshaw to enter the launch shaft sooner. Tr. 337:4–15 (Umlauf).

104. Mr. Wanhatalo testified that Bradshaw did not assume any of ECI's work in the shaft. Tr. 1319:1–1320:18 (Wanhatalo).

105. Mr. Short testified that he had a conversation with David Street (ECI's superintendent) about the work on the headwall. Tr. 1415:19–24 (Short).[8] According to Mr. Short, it was something ECI hadn't done before, and Mr. Street wasn't sure how ECI

[8] Mr. Street did not testify.

was going to build it. Tr. 1416:2–9 (Short). Mr. Short testified that he did not offer to take over the design of the headwall or construction of the headwall. Tr. 1416:10–15 (Short).

106. According to Mr. Wanhatalo and Mr. Short, Bradshaw only agreed to help with labor, nothing more. *See* Tr. 1319:7–9 (Wanhatalo) ("We can help you with labor, but a responsibility, no, nothing verbal, nothing in writing, no informal, no formal agreement, nothing."); Tr. 1416:21–23 (Short).

107. Relevant to this dispute is an email chain. On October 25, Mr. Wanhatalo asked ECI for a copy of the stamped FKE drawings for the launch shaft. D-10. Mr. Umlauf responded that same day attaching a copy of the stamped shaft drawings. *Id.* Mr. Umlauf also wrote: "Sounds like we are making some changes to reaction block and portal frame out – make sure I get some pictures or an as built of what we do there so that we can sign off on it." *Id.* According to Mr. Umlauf, this email was following up on his earlier conversation with Mr. Wanhatalo, and the request to get pictures or an "as built" was directed at Bradshaw. Tr. 339:2–18 (Umlauf). Mr. Wanhatalo testified at trial that he understood Mr. Umlauf's email to mean Mr. Umlauf would make sure he got some pictures or an as built, not a request directed at Bradshaw. Tr. 1314:16–1315:12 (Wanhatalo).

108. To resolve this factual dispute, I find as follows:

a. Several bilateral conversations occurred between ECI and Bradshaw personnel regarding construction of the headwall and thrust block. These included at least one in-person conversation at the Project site between Mr. Street and Mr. Short, an in-person conversation at the Project site between Mr. Marshall and Mr. Short, and a conversation between Mr. Umlauf and Mr. Wanhatalo.

b. Mr. Street expressed concerns about ECI building the headwall during a conversation with Mr. Short. To move the Project forward and avoid Bradshaw personnel from running out of work without access to the shaft, and because Bradshaw was familiar with constructing microtunneling headwalls, Bradshaw offered to take the leading role in constructing the headwall.

c. The parties reached an understanding that Bradshaw would build the headwall with ECI. No written document memorialized terms of this agreement.

d. ECI understood that Bradshaw would install the portal steel or equivalent reinforcing steel. Bradshaw never offered to install the portal steel according to FKE's drawings.

109. I reach these findings based on the following:

a. Mr. Marshall's testimony on this issue was credible. His recollection of events was strong. His testimony was natural, focused on responding to the questions based on the facts as he recalled them. His testimony was measured, and even under cross-examination he was calm and forthright. I was not persuaded that any attempted impeachment undermined his credibility on this issue.

b. For similar reasons, including his demeanor and memory, I found Mr. Umlauf's testimony on this issue credible.

c. Mr. Umlauf's October 25, 2019 email to Mr. Wanhatalo and Mr. Short supports that these conversations happened. *See* P-374. There, he wrote: "Sounds like we are making some changes to reaction block and portal frame out – make sure I get some pictures or an as built of what we do there so that we can sign off on

it." *Id.* The "we" is better understood to mean ECI in conjunction with Bradshaw, and the phrase, "make sure I get some pictures or an as built of what we do there," is best understood as requesting Mr. Wanhatalo or Mr. Short to provide pictures or an as built. Mr. Umlauf's request is consistent with Bradshaw offering to take on the leading role in constructing the headwall.

d. Mr. Wanhatalo's contrary testimony was not credible. His memory of events was spotty. He offered little factual detail regarding key conversations—such as the content of any specific conversation between him and Mr. Umlauf—instead falling back on general assertions. *See, e.g.*, Tr. 1320:6–8 (Wanhatalo) ("If we're going to expand our scope, we needed a formal written change order."), 1320:15–16 (Wanhatalo) ("[W]e couldn't go into the shaft until the shaft was complete . . . ."). Such testimony appeared inauthentic; it consisted of answers given to reach a conclusion rather than organic, factual responses to the question asked. And his testimony on cross-examination was combative and evasive. Moreover, based on his demeanor and the substance of his testimony, Mr. Wanhatalo's interpretation of Mr. Umlauf's October 25 email was not believable. *See* Tr. 1314:6–1315:12 (Wanhatalo).

e. Mr. Short's testimony does not entirely contradict ECI's version of events. For example, he testified about a conversation with Mr. Street regarding the construction of the headwall. Tr. 1415:19–24 (Short). To the extent Mr. Short testified that Bradshaw only agreed to assist with labor, his testimony was not credible. His testimony on this topic was inauthentic; his answers were cautious,

and like Mr. Wanhatalo, often seemed conclusion-directed rather than genuine, factual responses to questions.

f. Mr. Short and Mr. Wanhatalo's testimony that Bradshaw only offered to provide labor is also inconsistent with Bradshaw's eventual role in constructing the headwall.

g. Bradshaw was accustomed to building headwalls and thrust blocks. Tr. 1373:13–22 (Wanhatalo) ("[I]t was standard -- for our standard terms and conditions for any tunnel would be that we build the concrete thrust eye -- or thrust block . . . ."), 1372:19–22 (Wanhatalo) ("Commonly, more frequent in my experience, we -- it would be the contractual responsibility of Bradshaw to do our own thrust block and our own concrete launch eye . . . ."). Mr. Short likewise testified that Bradshaw had constructed headwalls in the past. Tr. 1416:7–8 (Short). Given Bradshaw's headwall experience and ECI's inexperience, Bradshaw offering to take the lead on building the headwall makes sense.

h. Bradshaw personnel repeatedly testified that they would not have agreed to perform the extra work without a change order. *See, e.g.*, Tr. 1321:1–2 (Wanhatalo) ("We don't do work without an approved change order."), 1388:20–21 (Wanhatalo) ("If there's a material change to the scope, then it needs a change order."). This was not persuasive. Eric Eisold, Bradshaw's vice president, testified that Bradshaw designed and built the thrust block (despite the thrust block being within ECI's scope of work). Tr. 1171:24–25 (Eisold). Mr. Short testified that Bradshaw "assist[ed] ECI with removal of spoils from the shaft" during construction

of the launch shaft, Tr. 1415:6–7 (Short), and that Bradshaw did not request a change order for, according to his version of events, providing labor to assist ECI build the headwall, Tr. 1416:21–1417:4 (Short). Nor did Bradshaw request a change order for the delayed start date despite the Subcontract reading: "A start date that is materially different than the scheduled date will be subject to a Change Order." J-7 ¶ 2(a).

i. In a November 19 email to Mr. Wanhatalo, Mr. Short wrote: "ECI agreed to provide carpenters to build all form work as long as [Bradshaw] could direct work." Tr. 1440:10–12 (Short).[9] Mr. Short writing "ECI agreed" supports the finding that an informal agreement was reached regarding construction of the headwall. And the phrase "direct work" supports that during these conversations Bradshaw offered to play a more substantial role than just providing labor.

j. To what extent the parties discussed the portal steel is harder to pin down. Mr. Umlauf testified that his conversation with Mr. Wanhatalo happened around October 23, before Mr. Wanhatalo received a copy of FKE's design on October 25. Tr. 337:4–10 (Umlauf). And Mr. Umlauf did not testify to specifically discussing the portal steel with Mr. Wanhatalo. *See* Tr. 337:6–339:18 (Umlauf). Nor did he clearly call out the portal steel in his October 25 email forwarding FKE's stamped design. *See* P-374. Mr. Marshall did not testify to specifically discussing the portal steel during his conversation with Mr. Short. *See* Tr. 426:22–427:17

[9] Though this email was not entered into evidence, no party has identified a reason why it should not be considered.

(Marshall). He did not testify, for example, that he showed Mr. Short a copy of FKE's design for the portal steel. And it is reasonable to infer this conversation happened before Mr. Umlauf's conversation with Mr. Wanhatalo because Mr. Marshall testified that he passed the proposal further up the chain of command. Tr. 428:1–5 (Marshall). Again, the testimony reflects that Bradshaw didn't have a copy of the drawings until October 25, so Mr. Short wouldn't have had a copy of FKE's design when he talked to Mr. Marshall. On this record, there is not a sufficient factual basis to conclude that Bradshaw offered to install the portal steel according to FKE's drawings.

October 30, 2019

110. On October 30, ECI worked in the launch shaft in the morning removing steel wire and girders from the tunnel entrance and spraying shotcrete. D-454 at 22. ECI then cleaned up the shaft and turned it over to Bradshaw at noon. *Id.*; *see also* J-35 at 164 ("[G]ave Bradshaw shaft @ 12."). ECI cut two lattice girders at the tunnel entrance. Tr. 1477:18 (Staheli); Tr. 1807:22–24 (McGinn); *see also* Tr. 390:23–391:2 (Umlauf); Tr. 298:8–10 (Johnson).

111. When ECI turned the launch shaft over to Bradshaw, the portal steel had not been installed and the concrete headwall had not been built. Tr. 432:4–13 (Marshall). The tunnel entry point was bare frozen ground. Tr. 1456:1–8 (Short); Tr. 598:1717–20 (Anderson) ("When Bradshaw took control of that area . . . your shotcrete down was bare. You should have seen a bare sandstone fascia . . . ."); Tr. 433:23–25 (Marshall) ("So behind this is the actual -- the ground of what we mined out, and then the so-called seal block

would be built into the surrounding area."), 434:20–24 (Marshall) ("[T]his was also the start of the tunnel boring machine where it would penetrate the ground. And what we did is we shotcreted around the area, leaving room to apply and build and construct the seal block.").

112. When Bradshaw entered the shaft, Bradshaw set its jacking frame to line and grade and marked the tunnel eye seal on the shaft wall. D-454 at 22.

113. Because Mr. Short was going home for the weekend, George Britton, a superintendent for Bradshaw, arrived on-site in the late afternoon of October 30 to cover the Project. D-454 at 22; Tr. 1251:17–21 (Britton); Tr. 1422:10–15 (Short).

114. When Mr. Britton arrived on site, Mr. Short went over everything with Mr. Britton. D-454 at 22. Mr. Short explained that the formwork needed to be complete ahead of a concrete pour on Monday, November 4. Tr. 1254:19–1255:10 (Britton); Tr. 1422:1616–1423:1 (Short). Mr. Britton and Mr. Short both were in the launch shaft around this time and observed the state of the tunnel entry point. Tr. 1259:15–21 (Britton); Tr. 1456:1–8 (Short). Mr. Britton described the tunnel entry point as "different," Tr. 1456:1–8 (Short),), and Mr. Short described the condition of the shotcrete walls at the tunnel entry point as "incomplete," Tr. 1456:1–8 (Short). Neither reported any concerns with the state of the tunnel entry point or launch shaft to ECI. Tr. 1259:22–24 (Britton); Tr. 341:8–10 (Umlauf).

115. That same day, ECI's ground-freezing subcontractor turned off the freeze system and began removing the brine. P-98 at 107.

116. Some testimony undermined the reliability of Mr. Anderson's field observation reports when it comes to dates. For example, some entries included identical notes for multiple days. *See, e.g.*, P-98 at 96, 98 (identical notes regarding a conversation with Mr. Johnson). Also, for his October 25 entry, Mr. Anderson wrote that SoilFreeze was "decommissioning the freeze tubes and compressors." *Id.* at 98. This raises questions about what date SoilFreeze turned off the ground-freeze system. To be clear—even if the ground-freeze system was turned off on October 25 instead of October 30, that would not change any of my other factual findings.

October 31 to November 3, 2019

117. On October 31, ECI removed freeze pipes. D-454 at 24. Consequently, Bradshaw did not perform work in the launch shaft due to the risk of falling objects. *Id.*

118. Because Bradshaw could not work in the shaft, it performed some testing and finished setting up its equipment topside. *Id.*

119. On November 1, Bradshaw began building the formwork for the headwall. D-454 at 26 ("BCC back. In shaft this morning starting to build form work."); Tr. 435:10–21 (Marshall). Formwork is used to build a wall for concrete to be poured in behind it. Tr. 435:8–17 (Marshall). In other words, formwork contains and shapes fluid concrete until it solidifies.

120. I find that primarily Bradshaw personnel built the formwork based on the following:

a. Mr. Marshall's testimony, based on his personal observations, was credible.

b. Mr. Short testified that ECI built the formwork. Tr. 1442:18–20 (Short). His testimony on this issue was not credible. Mr. Short was not on the Project site when the formwork was built and therefore did not observe its construction. Tr. 1423:5–18 (Short). And this testimony is inconsistent with the contemporaneous daily reports that he wrote based on phone calls with Mr. Britton. *See* D-454 at 28.

c. To the extent Mr. Britton testified Bradshaw only "assisted" or "helped" ECI with the formwork, this was not credible. First, this testimony is inconsistent with Bradshaw's contemporaneous reports. *See, e.g.*, *id.* Second, Mr. Britton's repeated testimony that Bradshaw only helped or assisted ECI lacked authenticity. *See* Tr. 1256:3 (Britton) ("Just assisting them in helping them put the form up . . . . . ."); 1258:12–13 (Britton) ("We was down in the shaft helping ECI finish up the formwork . . . ."); 1272:2–3 (Britton) ("I'm the one that was assisting them."); 1276:7–8 (Britton) ("Just down there assisting them to get the concrete poured."). These answers left the impression that Mr. Britton was not describing facts as he could recall them, but instead was attempting just to provide a characterization or interpretation of what happened. Third, though Mr. Britton did not describe in granular detail who performed what work to construct the formwork, he was able to recall that ECI personnel performed the welding. Tr. 1257:21 (Britton). Fourth, Mr. Britton testified that on November 2 he "was down in the shaft helping ECI finish up the formwork." Tr. 1258:10–13 (Britton). But he testified that there was "a welder and maybe another helper also" from ECI in the

shaft, Tr. 1258:21–24 (Britton), while he and "maybe one or two" Bradshaw personnel were in the shaft, Tr. 1258:19–20 (Britton). In other words, his testimony of "a welder and maybe another helper" being in the shaft from ECI is inconsistent with Bradshaw helping ECI build the formwork. To the contrary, it suggests ECI helped Bradshaw build the formwork.

d. No other Bradshaw witness had firsthand knowledge of who built the formwork.

121. I also find that Bradshaw, with help from ECI, set up the formwork, including reinforcing metal, for the headwall. D-454 at 26, 28; P-98 at 114 (describing Bradshaw installing the portal frame). This is consistent with Mr. Short later providing ECI with an as-built sketch of the headwall. *See* P-381 at 3.

122. At times, ECI's laborers were also in the shaft preparing for the concrete pour. Tr. 1257:19–1258:1, 1258:21–24 (Britton). This included participating in building the formwork. For example, an ECI employee welded junior beams across the form panels to hold the formwork against the wall. Tr. 1257:19–1258:1, 1258:21–24 (Britton).

123. During this time Bradshaw built and installed a wooden donut, also called a wooden cookie, in the launch shaft. Tr. 434:3–8 (Marshall); Tr. 1370:21–1371:3 (Wanhatalo). The wooden donut is encased in concrete and provides the space where the MTBM will go through the shaft wall and enter the subsurface. Tr. 1254:15–18 (Britton). Because the donut determines where the MTBM enters the subsurface, its placement is key to the MTBM entering the subsurface on the correct tunneling alignment. *See* Tr. 1254:23–1255:3 (Britton). The wooden donut can be seen in the following picture:

P-732.

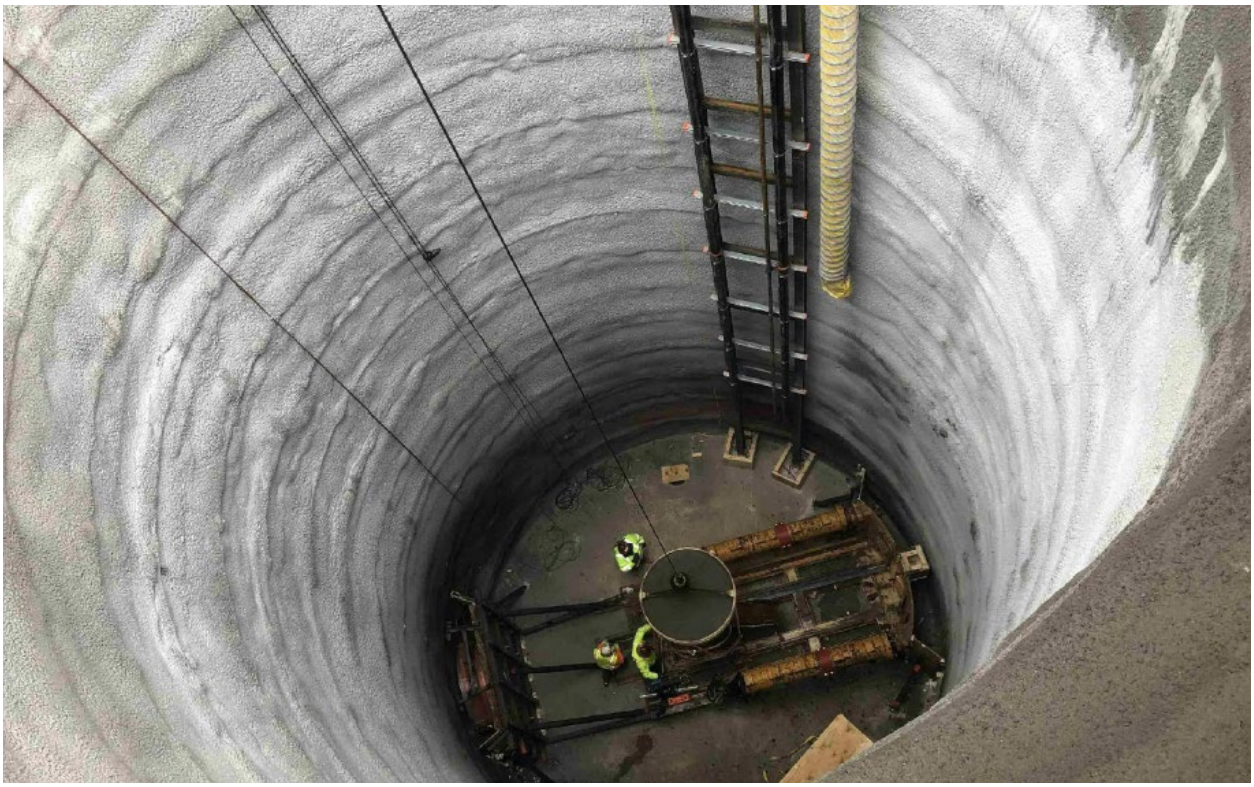
124. For context, welded wire fabric can be seen above the wooden cookie. *See Id.* The walls (darker gray with a rough texture) are shotcrete and the base of the shaft (a lighter color of gray with a smoother texture) is the concrete plug. *Id.* The metal rods around the wooden donut are rebar—metal rods placed inside concrete for reinforcement. Tr. 432:18–21 (Marshall) (describing the picture); *Rebar*, Merriam-Webster's Collegiate Dictionary (11th ed. 2003) ("[A] steel rod with ridges for use in reinforced concrete."). The yellow string on the right of the photograph is a plumb line; the golden cone-shaped weight on the end of the plumb line is a plumb bob.

November 4, 2019, the Concrete Pour

125. ECI procured, purchased, and specified the concrete to be used for the pour from its subcontractor Cemstone Products. Tr. 503:9–21 (Marshall); Tr. 1260:10–12 (Britton). The concrete was batched at Cemstone's batching facility, mixed there, and driven out to the Project site in a Cemstone truck. Tr. 503:17–21 (Marshall).

126. ECI supplied a concrete bucket and crane. Tr. 1260:13–1261:11 (Britton); Tr. 438:16–23 (Marshall). ECI employees backed in their concrete truck and filled a concrete hopper at the top of the launch shaft. Tr. 437:12–17 (Marshall) ECI's crane operator would then lower the concrete hopper into the shaft. *Id.*

127. The concrete hopper, filled with concrete, can be seen in the following photograph:



P-416.

128. Bradshaw personnel, located in the launch shaft, poured the concrete from the concrete bucket into the forms. Tr. 435:18–21 (Marshall); D-454 at 29 ("Pouring concrete today at 10am. Using concrete bucket and chute to place concrete.").

129. Testimony that ECI employees poured concrete from the bottom of the launch shaft was not credible.

a. Mr. Britton testified that he personally observed ECI personnel pouring the concrete headwall. Tr. 1265:15–25 (Britton). It's not clear exactly what he meant by "pouring," but to the extent he meant ECI employees in the launch shaft physically poured the concrete, this was not persuasive. Mr. Britton testified in his deposition that he could not recall observing the concrete pour and at that time did not know who poured the concrete. Tr. 1266:1–1267:14 (Britton). Mr. Short testified that Bradshaw personnel poured concrete from the bucket. Tr. 1426:17–19 (Short). And Mr. Anderson testified that although ECI personnel occasionally entered the launch shaft, Bradshaw personnel were mainly down in the launch shaft pouring concrete into the forms. Tr. 595:22–596:8 (Anderson).

b. A substantial amount of testimony at trial characterized who "constructed," "built," or "poured" the concrete. Likewise, some witnesses characterized Bradshaw's role as "helping" or "assisting" ECI. Testimony characterizing the facts was not persuasive.

130. ECI had a concrete vibrator at the Project site, which is a tool used to help consolidate concrete. Tr. 438:24–439:4 (Marshall).

131. Inserted into the concrete as it's poured, a concrete vibrator consolidates concrete by vigorously shaking it, so that the poured concrete does not end up with voids or air pockets (a defect called honeycombing). Tr. 439:5–13 (Marshall); *see also* Tr. 93:3–11, 96:18–97:1 (Johnson).

132. Mr. Marshall offered the concrete vibrator to Mr. Short while the headwall was being poured, but Bradshaw personnel did not use it. Tr. 439:14–21,453:12–16 (Marshall). Because a concrete vibrator was not used, portions of the headwall did not consolidate properly. Tr. 453:3–11 (Marshall). This poor consolidation can be seen in the following photograph:

P-242 at 2; Tr. 451:7–453:11 (Marshall) (discussing P-242).

Omission of the Portal Steel

133. At some point ECI procured the components for the portal steel outlined in FKE's drawings. *See* Tr. 238:25–239:11, 295:8–12 (Johnson). Mr. Marshall testified that when Bradshaw entered the shaft on October 30 the portal steel had not been installed. Tr. 502:9–12 (Marshall).

134. Mr. Marshall testified that ECI had staged the portal steel at the top of the shaft. Tr. 435:22–436:2 (Marshall). Mr. Umlauf testified that the portal steel was either at ECI's workshop in Roberts, Wisconsin, or on-site. Tr. 389:2–9 (Umlauf).

135. Regardless of where the portal steel was, ECI never gave the portal steel to Bradshaw. Tr. 388:7–8 (Umlauf). Nor did ECI attempt to coordinate a handoff of the portal steel from ECI to Bradshaw. Tr. 389:9–21 (Umlauf); Tr. 1420:16–18 (Short). I find that no ECI employee told Bradshaw personnel that the portal steel—or portal-steel components—was available for installation (on-site or otherwise).

136. I find that the portal steel was never installed.

a. The basis for this finding requires some explanation. The portal steel was not installed by October 30, when Bradshaw entered the shaft. Tr. 432:4–13 (Marshall). Just by comparing the tunnel entrance and FKE's drawings, it's questionable whether the portal steel could have been embedded in the shaft wall after ECI turned over the shaft to Bradshaw. *Compare* P-732, *with* D-432 at 2 (FKE's portal-steel design). Regardless, based on Mr. Johnson and Mr. Marshall's testimony it can be inferred that ECI never installed the portal steel. Tr. 240:21–24, 294:13–18 (Johnson); Tr. 435:22–436:2 (Marshall). Nor did ECI ever give the

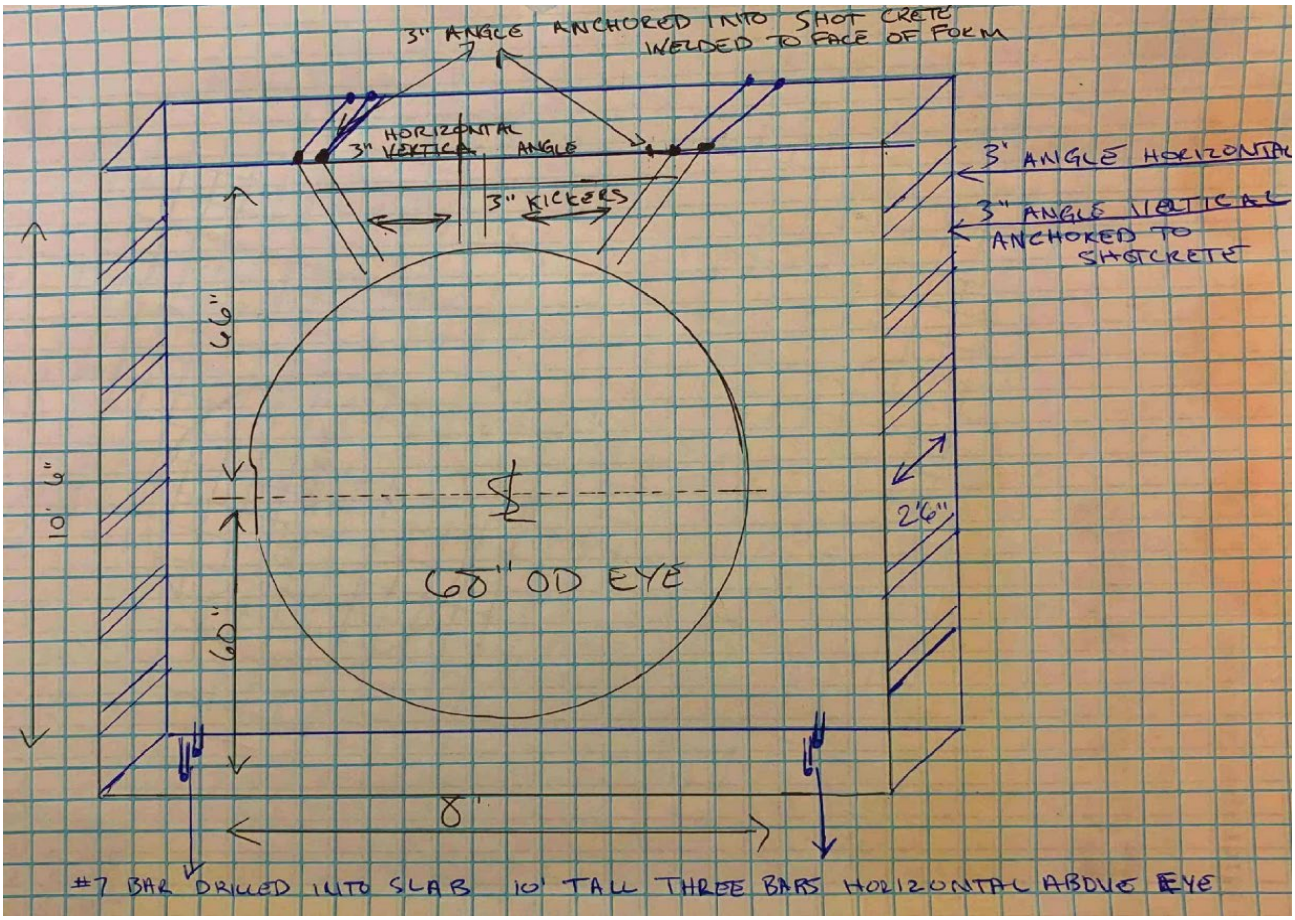
portal steel to Bradshaw. Tr. 388:7–8, 389:9–2121 (Umlauf). And Bradshaw never procured it. *See, e.g.*, Tr. 1419:21–1420:15 (Short). Plus, there's no evidence in the record that Bradshaw installed the portal steel; Bradshaw's as-built drawing of the headwall does not include the portal steel. *See* P-381 at 3 (as-built drawing).

b. There's another good reason to reach this conclusion—both parties propose a finding that the portal steel was omitted. *See* ECF No. 530 at 66–69 (Bradshaw's proposed findings discussing ECI's failure to install the portal steel); ECF No. 531 ¶ 202 (proposing a finding that "Bradshaw did not install any portal steel when it constructed the headwall").

c. Mr. Anderson's testimony contradicts this finding. Mr. Anderson testified, "I saw the portal steel being worked on up top. I saw from up top the portal steel being lowered down into the frame itself. I saw reinforcing steel down there. And, yes, I saw portal steel down there in the bottom of the -- at the portal eye itself." Tr. 597:14–20 (Anderson). Having carefully reviewed his testimony regarding the portal steel, Tr. 597:2–600:3, 607:4–608:14 (Anderson), I believe Mr. Anderson watched Bradshaw and ECI installing reinforcing steel illustrated in Bradshaw's as-built drawing, *see* P-381 at 3, not the portal-steel components in FKE's drawings.

137. Nobody reported that the portal steel was omitted. Tr. 300:7–18 (Johnson).

138. The headwall was constructed according to the following as-built drawing:



P-381 at 3.

139. This included installing steel angle irons (also known as kickers) around the tunnel eye, anchoring them into shotcrete. *See* P-381 at 3.

140. I find that this design was Bradshaw's for several reasons.

a. Mr. Short sketched the as-built drawing. Tr. 1438:3–10 (Short). Mr. Wanhatalo sent the as-built drawing as an attachment to Mr. Umlauf on November 12. *See* P-381. This is consistent with Bradshaw's conversations with ECI to take the lead on the headwall and Mr. Umlauf's email requesting an as-built drawing.

b. FKE's drawings did not include a design for a headwall. *See* D-432. They only included a design for portal steel embedded in the shaft wall. *See id.* Nor

is there any evidence in the record that someone from ECI developed a headwall design. As Mr. Short testified, ECI lacked experience in this area, Tr. 1416:2–9 (Short), so it's unlikely that ECI created a design last minute.

c. Having found that Bradshaw (mainly) constructed and placed the forms, it makes sense that they did so according to their design. After all, Bradshaw often constructed headwalls on its microtunneling projects. Tr. 1372:19–22, 1373:13–22 (Wanhatalo); Tr. 1416:4–99 (Short).

d. Mr. Wanhatalo testified that his email to Mr. Umlauf attaching Mr. Short's as-built did not mean Bradshaw built or designed the headwall. Tr. 1329:3–11 (Wanhatalo). I find his testimony not credible for the same reasons already discussed. Mr. Short testified that he put the sketch together because Mr. Eisold asked for it. Tr. 1438:3–13 (Short). He stated that it was not a response to Mr. Umlauf's October 25 email, nor was it intended to constitute the design of the headwall. Tr. 1438:21–1439:5 (Short). To the extent Mr. Short sought to minimize the importance of the as-built drawing (P-381), I was not persuaded. His answers on this issue were cautious and, at times, not forthright. For example, when asked on cross-examination, "how did you know in this case how to draw the as-built of a head wall," Mr. Short responded, "from pictures." Tr. 1447:7–13 (Short). When pressed for details, he added that he knew how to draw it based on conversations with Mr. Britton. Tr. 1448:5–1449:13 (Short).

141. Bradshaw did not, at any time between October 30 and when tunneling commenced, report any deficiencies or defects in any of ECI's launch-shaft work. Tr. 84:17–21 (Johnson).

The First Flooding Event

142. Bradshaw commenced tunneling on November 7, 2019. Tr. 84:22–23 (Johnson); *see also* D-454 at 35; P-98 at 119.

143. When the night shift began, Steve Malm (a Bradshaw employee) was operating the MTBM. Tr. 1208:12–16 (Malm).

144. The MTBM successfully launched, and conditions improved as the MTBM breached the frozen ground surrounding the launch shaft. Tr. 1215:3–11 (Malm). Shortly after breaching the frozen ground, Mr. Malm was told to stop mining because water had started coming into the launch shaft. Tr. 1215:22–1216:23 (Malm). Mr. Malm stopped the MTBM after it had advanced roughly seventeen feet into the subsurface along the tunneling alignment. D-454 at 35.

145. Mr. Malm called Mr. Marshall and told him water was entering the launch shaft. Tr. 449:9–11 (Marshall). Mr. Marshall immediately returned to the Project site. Tr. 449:9–22 (Marshall).

146. Mr. Marshall went down into the launch shaft by crane in a man basket. Tr. 450:9–18 (Marshall). There were a couple of inches of water on the floor and significant amounts of water spraying from the face of the headwall into the shaft, with some minor leaks in other shaft locations. Tr. 450:21–451:3 (Marshall). He observed that the largest

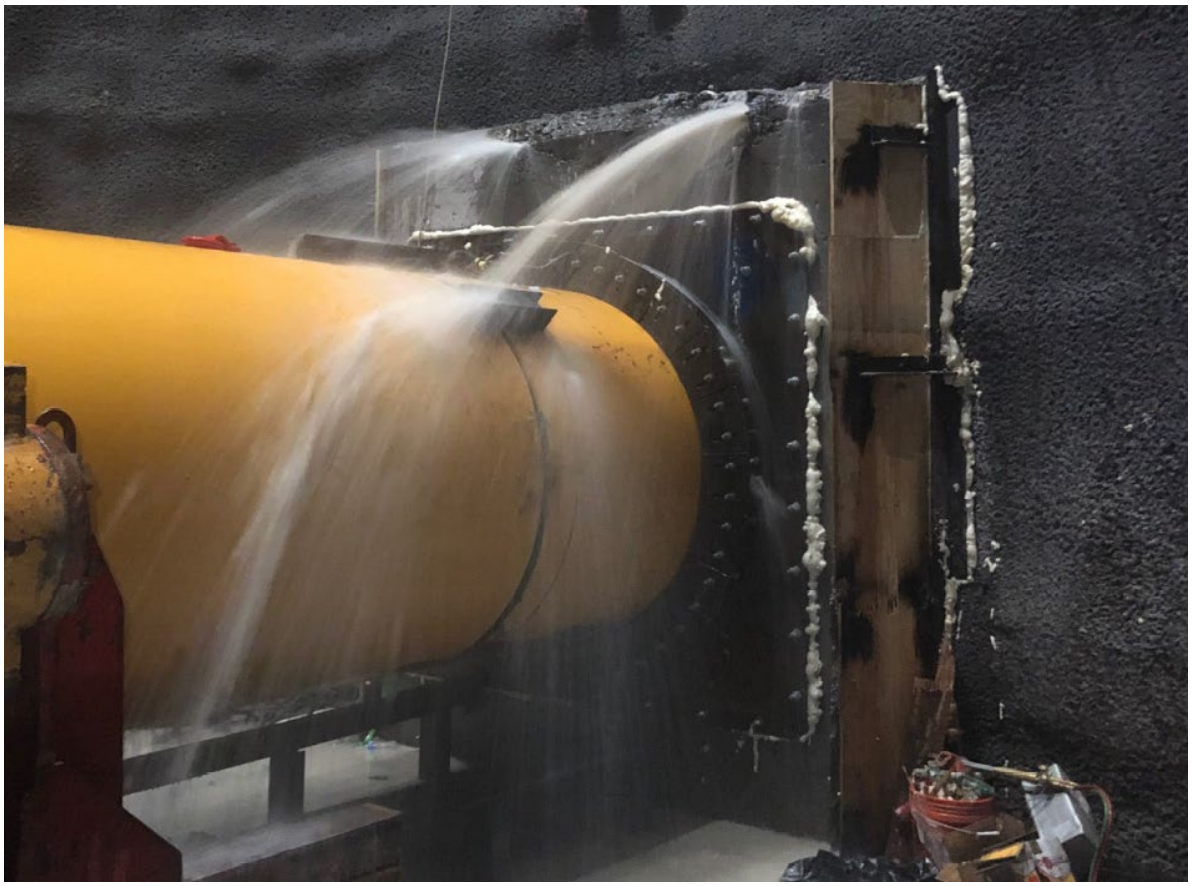
inflows of water were coming through the headwall, specifically at two points where the angle irons were installed near the top of the headwall. Tr. 451:12–452:15 (Marshall).

147. The main water inflows can be seen in the following photograph:

D-382.

148. Mr. Johnson and Mr. Anderson, licensed engineers, concluded based on their review of photographs that the path of the water was through the concrete headwall, along the alignment of the steel members (kickers). Tr. 88:13–90:9 (Johnson); *see also* Tr. 541:9–13 (Anderson).

149. A second photograph from a lower vantage point confirms that the largest inflows of water entered the shaft through the headwall:



D-351.

150. Based on these photographs and testimony, I find that the main path of water entering the launch shaft on November 7 was through the headwall.

a. This is mostly consistent with testimony from Bradshaw personnel on-site. Mr. Britton testified that the water mainly entered through the two points that can be seen in the photographs. Tr. 1263:16–17 (Britton). And Mr. Malm testified that the water was "coming in at the headwall." Tr. 1217:12 (Malm). It's also consistent with Bradshaw's daily report. D-454 at 35 ("Water started coming up between angle used to kick eye down and concrete.").

b. Roger Lewis's testimony is somewhat inconsistent with this finding. Mr. Lewis was Bradshaw's nightshift superintendent, and he arrived on-site twenty minutes before the flood. Tr. 1284:10–12, 1285:4–7 (Lewis). Mr. Lewis observed from the top of the launch shaft that water was coming over the top of the headwall. Tr. 1285:20–24 (Lewis). After going down into the launch shaft, he saw "two angles on top of the wall where water was rushing out of it and started to flow along the top of the headwall where the shotcrete was." Tr. 1286:15–17 (Lewis). It's not clear what he meant by describing the water coming "over the top of the headwall" and at "two angles on top of the wall." I don't understand his testimony as suggesting the main water intrusions originated at the shotcrete launch-shaft wall instead of the headwall. But if that's what he meant, I would find it inconsistent with the weight of evidence introduced at trial.

151. As ECI and Bradshaw personnel rushed to analyze the situation, the water inflows increased. Tr. 1217:21–25 (Malm). ECI had three pumps in the shaft, one primary pump and two emergency pumps. Tr. 1287:11–19 (Lewis); Tr. 1218:5–6 (Malm); D-34 at 1. Although the primary pump was operational, the two emergency pumps were "burnt up." D-34 at 1; Tr. 1218:1–17 (Malm). The water flowed in faster than ECI's operational pump could draw it out of the shaft. D-34 at 1; Tr. 1220:8–12 (Malm); Tr. 1263:21–1264:1 (Britton); Tr. 1287:22–24 (Lewis).

152. Bradshaw decided to draw water through the MTBM and into the separation plant to stop the water flowing into the launch shaft. Tr. 1218:20–24 (Malm); Tr. 1287:7–10 (Lewis). Bradshaw was able to use the MTBM to pump water up to the separation plant

for about ten minutes before the variable frequency drive was tripped. D-34 at 1; Tr. 1219:11–24 (Malm).

153. After the variable frequency drive was initially tripped, Bradshaw pumped for a second, shorter time before it tripped again. D-34 at 1–2; Tr. 1219:25–1220:7 (Malm). The amount of water entering the separation plant was significant and eventually overran the tanks. Tr. 1262:24–1263:1 (Britton).

154. During this time ECI and Bradshaw personnel attempted to stop the water without success. Tr. 1288:7–14 (Lewis). They eventually decided to abandon the launch shaft and allow it to flood. *Id.*

155. Bradshaw relied on pictures of the event to estimate the water inflows. Mr. Eisold testified based on his review of photographs that the groundwater was flowing into the launch shaft "way in excess of 200 gallons a minute." Tr. 1100:5–1101:15, 1104:2–1105:3 (Eisold). Mr. Eisold also estimated that Bradshaw's pump had been drawing water from the tunnel at more than 1,000 gallons per minute. Tr. 1104:2–21 (Eisold).

What Caused the First Flood Event

Dr. Kimberlie Staheli's Expert Opinion

156. Bradshaw called Dr. Kimberlie Staheli as an expert witness at trial. Dr. Staheli has a Ph.D. in geotechnical engineering with a focus on trenchless technology, a science that allows one to place a pipe in the ground without digging it up. Tr. 1459:11–20, 1462:22–1463:1 (Staheli). Her Ph.D. dissertation was on the development of jacking forces. Tr. 1463:2–6 (Staheli). Dr. Staheli is well-versed in microtunneling and has operated MTBMs herself. Tr. 1460:15–1460:3 (Staheli).

157. Dr. Staheli testified about the impact of the omission of the portal steel and cutting two lattice girders on the structural integrity of the launch shaft. She opined that without the support of the portal steel, excessive loads caused the launch shaft to flex, damaging the shaft wall. Tr. 1473:11–1475:13, 1841:7–1842:7 (Staheli). Loading is lateral pressure. Tr. 1780:12–18 (McGinn). When you excavate, soil wants to move inward, imparting a load on the shaft walls. Tr. 1780:19–25 (McGinn). Here, the lateral loads on the launch-shaft wall are mainly caused by groundwater and soil. Tr. 1780:12–18 (McGinn). Dr. Staheli also opined that cutting two lattice girders forced more load to be transferred around the side of the shaft, contributing to the shaft flexing. Tr. 1477:16–22 (Staheli).

158. Dr. Staheli opined that without the support to transfer the loads around the portal, excessive loads caused flexure of the shaft, resulting in damage to the inner concrete liner. Tr. 1475:6–24 (Staheli). Dr. Staheli opined that omission of the portal steel would have resulted in the water intrusion regardless of any deficiencies with the concrete headwall. Tr. 1517:2–18, 1548:12–1550:16 (Staheli). To summarize, Dr. Staheli opined that the omission of the portal steel and cutting of two lattice girders caused the November 7 flood event.

159. In part, her conclusions were based on calculations of soil and groundwater loading on the shaft wall. Tr. 1860:11–15 (Staheli).

Dr. Arthur J. McGinn's Expert Opinion

160. ECI called Dr. Arthur J. McGinn to rebut Dr. Staheli's testimony. Dr. McGinn is the president and CEO of Brierley Associates, a design firm that specializes in

designing underground spaces such as tunnels. Tr. 1739:22–1740:5 (McGinn). Dr. McGinn is a professional engineer who holds a bachelor's degree in civil engineering, a master's degree in civil engineering, and a Ph.D. in geotechnical and structural engineering. Tr. 1741:2–7, 1742:21–22 (McGinn).

161. Dr. McGinn disagreed that the second cut lattice girder and omission of the portal steel caused the first flood event.

162. He testified that because the freeze wall was taking most of the load on November 7, the removal of the lattice girders and portal steel had little to no impact on the overall structural integrity of the shaft at that time. Tr. 1782:16–1783:3, 1807:5–12 (McGinn). He opined that the shotcrete liner was only bearing a minimal load on November 7 because of the still-intact frozen mass. Tr. 1781:14–15 (McGinn).

163. Dr. McGinn testified that although Dr. Staheli's calculations were numerically correct, she reached the wrong conclusion because she didn't account for the frozen ground in her load-bearing analysis. Tr. 1785:3–22 (McGinn). Dr. McGinn also noted that Dr. Staheli's calculations failed to account for the inherent strength of undisturbed sandstone. *Id.*

164. Finally, Dr. McGinn opined there was no evidence of cracking or buckling in the launch-shaft walls, evidence of structural failure. Tr. 1778:1–25 (McGinn). This cracking or buckling would show up as vertical indentations in the shaft wall because buckling occurs perpendicular to the loading and thrust around the perimeter of the shaft. Tr. 1779:1–4 (McGinn).

Findings on Causation

165. I find that the cause of the November 7 flood event was poorly consolidated concrete. This finding is supported by the evidence of poorly consolidated concrete, P-242; Tr. 453:3–11 (Marshall); P-98 at 121, and the location of water inflows, *see* D-351; D-382. This finding is further supported by ECI and the City's contemporaneous analysis. Tr. 88:13–90:9 (Johnson); *see also* Tr. 541:9–13 (Anderson); P-98 at 121 ("Based on my pictures it appears the headwall had I-beams placed too close to the concrete face in the member and poorly consolidated concrete.").

166. I do not find that shaft flexure caused the November 7 flood event. Dr. McGinn's testimony that the frozen ground prevented substantial shaft flexure was persuasive. His testimony was measured, thoughtful, and thorough. Dr. Staheli's calculations failed to account for this frozen mass, instead only relying on soil and groundwater loads. Tr. 1857:25–1858:5, 1860:12–15 (Staheli). And Dr. Staheli did not adequately explain why the lateral loads would be sufficient to cause shaft flexure despite this frozen mass on November 7.

167. Relatedly, I find that the frozen mass was largely intact on November 7. The ground-freeze system had only been turned off for about a week. *See* P-98 at 107. Dr. McGinn credibly testified that it takes a significant amount of time for frozen ground to thaw. Tr. 1808:21–25 (McGinn); *see also* Tr. 1842:12–13 (Staheli) ("In frozen shaft design it does take a long time to melt . . . ."). And Dr. Staheli did not dispute that the shaft was frozen on November 7. Tr. 1857:17–24 (Staheli). Moreover, this is consistent with Mr. Malm's testimony that the machine picked up speed as it breached the frozen ground. Tr.

1215:3–11 (Malm). Regardless of the exact thickness, I find that on November 7 the shotcrete shaft liner was bearing a minimal load from lateral groundwater and soil pressure. Therefore, I do not find the omission of the portal steel and cutting of two lattice girders—structural components of the launch shaft—caused the launch shaft to flex, in turn resulting in the November 7 flood event.

Grouting to Remediate the November 7 Leak

168. To remediate this flooding, ECI developed a plan to block the groundwater flowing into the launch shaft. The plan called for the injection of a grout composed of cement and bentonite (a lubricant). P-570. The grout would be injected from the ground surface down to the subsurface near the MTBM. *Id.*

169. Grout is a fluid material that is used to fill openings, a mixture of cement, water, and additives. Tr. 793:23–794:4 (Hirner).

170. The composition of grout determines its strength and viscosity.[10] Grout with a higher cement content is more viscous—*i.e.*, will flow less easily—and is higher strength. Tr. 797:1–11 (Hirner). Grout with a higher water content is thinner and lower strength. Tr. 1834:15–25 (Staheli). Additives modify the strength and viscosity of a grout mixture. Tr. 797:5–11 (Hirner). Relevant here, bentonite weakens the strength of grout. Tr. 797:12–15 (Hirner).

171. ECI developed its grouting plan, in part, based on conversations with Bradshaw. Mr. Umlauf and Mr. Johnson participated in conversations with Bradshaw on

[10] Viscosity is "the property of resistance to flow in a fluid or semifluid." *Viscosity*, Merriam-Webster's Collegiate Dictionary (11th ed. 2003).

how best to resolve the leaks while protecting the MTBM. Tr. 94:23–95:2 (Johnson); Tr. 346:23–347:14 (Umlauf).

172. These conversations were important because grout could damage the MTBM. Strong grout can create an adhesion bond to the machine or casing, locking it in place. Tr. 472:11–15 (Marshall); Tr. 830:24–831:23 (Hirner). Grout can also clog the MTBM's cutterhead, impeding tunneling progress. Tr. 1224:1–20 (Malm); Tr. 1435:6–24 (Short); Tr. 1327:10–14 (Wanhatalo).

173. On November 8, Mr. Johnson sent an email to the City and Black & Veatch outlining the grouting plan. P-666.

174. That same day, Mr. Umlauf sent an email to Bradshaw explaining the plan as follows: "To summarize the work plan we discussed, ECI will bring out a drill rig tonight, and will drill holes (probably 4-6) over the top of the tunneling alignment outside of the shaft. We will use a hollow stem auger or a steel casing, and pump a high mobility bentonite/Portland mix (50 [pounds] bentonite, 180 [pounds] Portland type 1, 40 gallons of water, plus Anti-Washout). We will also attempt to install a TAM grout pipe in each of the drilled holes, which will allow us to get back into the holds if needed/desired at a later time." P-570; Tr. 95:7–19 (Johnson).

175. Mr. Marshall prepared about ten different grout mixes and then showed Bradshaw the viscosities and strengths after drying. Tr. 457:3–21 (Marshall). Bradshaw selected a mix it felt was adequate and would not damage their machine. Tr. 457:3–21; 458:15–459:2; 460:1–2 (Marshall). Mr. Short and Mr. Malm were part of these discussions selecting the grout mix. Tr. 457:24–458:2 (Marshall). Although no other witness or

document specifically corroborated Mr. Marshall's testimony, no evidence in the record persuasively contradicted it. Based on his memory and demeanor, I found Marshall's testimony in this regard credible.

176. The grout selected by Bradshaw and used by ECI in the grouting operation was relatively low strength. It had a consistency "a little harder than pudding" and was "low strength, to a point where you could almost probably carve it out with a spoon or a fork." Tr. 459:3–13 (Marshall). In his daily report, Mr. Anderson observed that ECI mixed the grout using two bags of Portland cement, forty gallons of water and one-half bag of bentonite. P-98 at 121.

177. Although Bradshaw had concerns about protecting its machine, *see, e.g.*, Tr. Tr. 1326:3–19 (Wanhatalo), no one from Bradshaw objected to the final grouting plan, Tr. 101:13–15 (Johnson); Tr. 348:7–8 (Umlauf); Tr. 460:16–21 (Marshall).

178. Before ECI started grouting, Bradshaw pumped bentonite into the annulus to protect the machine. Tr. 1435:15–20 (Short).

179. Between November 9 and 11, ECI drilled holes so that grout could be injected into the subsurface. Tr. 101:3–5 (Johnson).

180. Some Bradshaw employees were at the Project site while ECI drilled the holes and performed the grouting. Tr. 101:10–12 (Johnson); *see also* D-454 at 37–38.

181. The grout successfully stopped water from entering the launch shaft through the headwall. Tr. 101:19–20 (Johnson); Tr. 460:22–461:1 (Marshall).

Bradshaw Submits Its First Notice of Differing Subsurface Conditions

182. On November 15, eight days after the November 7 flood, Bradshaw submitted a Notice of Differing Subsurface Conditions. P-512. Bradshaw claimed that groundwater flows encountered on the project were more than what was warranted in the Baseline Report. *Id.*

183. Black & Veatch rejected Bradshaw's excessive-groundwater claim. P-398; *see also* Tr. 741:1–16, 743:17–23, 745:5–746:3 (Hirner). Bradshaw's subsequent appeal was also denied. P-518.

Bradshaw Resumes Tunneling and the Second Flood Event

184. With the leaks stopped and water pumped out of the launch shaft, Bradshaw resumed microtunneling on November 23, 2019. It advanced fourteen feet that day. D-454 at 53.

185. On November 24, Bradshaw winterized its equipment, and its personnel left the Project site with a plan to return after Thanksgiving break. D-454 at 55.

186. Bradshaw returned to the Project on December 2, to de-winterize and test its equipment. D-454 at 57. Bradshaw's equipment was in good working order. *Id.*

187. Bradshaw resumed microtunneling on December 3. D-454 at 59. During the dayshift, Bradshaw mined roughly seven feet without water inflows. *Id.*

188. Before long, water started coming in through Bradshaw's tunnel eye seal. P-602; D-386; Tr. 111:4–12 (Johnson); Tr. 356:3–13 (Umlauf); Tr. 463:7–9 (Marshall). The seal was inverting as the machine advanced, allowing water to bypass the seal and enter the launch shaft. Tr. 461:14–23 (Marshall).

189. The leaks can be seen in the following to photographs:

P-602 at 3; P-602 at 4.

190. Although ECI had two pumps running, eventually the rate of water increased to a degree that ECI's pumps could not keep up. D-454 at 59; Tr. 1293:24–1294:6 (Lewis). The launch shaft was abandoned and flooded for a second time. Tr. 464:10–16 (Marshall).

191. Mr. Hirner testified that at the time of the second flood, Black & Veatch performed some rough measurements on the inflows coming in and on average, it was 250 gallons per minute and as high as 750 gallons per minute through the launch seal. Tr. 762:7–10 (Hirner).

192. I do not reach a finding as to why the seal failed.

a. ECI did not offer evidence as to why the seal failed.

b. Bradshaw contended at trial that ECI's grouting to remediate the November 7 flood caused the seal to fail. But there was insufficient credible, admissible evidence to support this theory. Bradshaw entered into evidence an email dated December 12, in which Mr. Umlauf wrote: "The existing rubber seal is puckered out approximately 3.5 [inches] from the face of the steel fingers." D-184 at 4. Attached to the email was the following photograph:

D-184 at 3.

c. The pink is an indicator of grout. Tr. 832:6–10 (Hirner). This photograph is of the casing through the launch seal that is bolted to the headwall. *Id.* This photograph does not support Bradshaw's theory. There is no evidence in the record linking this photograph to the grouting to remediate the November 7 leak. And this photograph was sent on December 12—after grouting efforts to remediate

the December 3 leak. The only reasonable inference is that this photograph—and the indicator of grout seen in this photograph—relates to ECI's grouting efforts to remediate the December 3 leak. In short, it does not suggest grouting to remediate the November 7 leak damaged the seal.

d. Mr. Wanhatalo's testimony that the grouting to remediate the November 7 leak damaged Bradshaw's eye seal was not credible for several reasons. First, his testimony was based mainly on the December 12 email and attached photograph. Tr. 1334:23–1338:1 (Wanhatalo). But he never explained why this email would be related to the post–November 7 grouting rather than the post–December 3 grouting. *See id.* Nor did he provide some other explanation or foundation for his opinion. And he conceded on cross-examination that he did not personally observe the grouting. Tr. 1393:22–1394:1 (Wanhatalo). Second, based on his demeanor and the substance of his testimony, I did not find his testimony on this issue credible. His memory of details and dates was unreliable. *See, e.g.*, Tr. 1396:24 (Wanhatalo). His answers on cross-examination were evasive. And (as previously discussed) his answers were directed more at asserting conclusions than facts that might support conclusions. His testimony that the grout was pumped at pressure, Tr. 1393:10–1394:8 (Wanhatalo), was not credible or based on personal knowledge.

e. Lester Bradshaw, Bradshaw's president, testified that the grout was pressurized. Tr. 1658:1–8 (Lester) ("ECI's plan was grout from the outside, and we understood they were going to auger down holes and they were going to gravity-

flow grout in. That's not what happened. We find out later on that the auger system failed, so they went to their pressure drilling system and they went to pressure grouting."). He also testified that grouting damaged Bradshaw's tunnel eye seal. Tr. 1714:20–22 (Lester). This testimony lacked an adequate foundation and will not be considered. Mr. Bradshaw lacked personal knowledge of these events because he was not present at the Project site in 2019. Tr. 1701:17–19 (Lester). His testimony regarding grouting damaging the tunnel eye seal was based on secondhand information. Tr. 1701:20–22 (Lester). Although Mr. Bradshaw has considerable experience in microtunneling, he was never offered as an expert witness.

f. Other evidence entered at trial is sufficient to conclude that ECI pumped the grout into its drill holes. Mr. Lewis testified that "I saw the drill rig drilling a hole and I saw the grout pump being placed." Tr. 1292:4–5 (Lewis). Mr. Marshall wrote in his log on November 9 that ECI "pumped 5 batches into hole." J-35 at 169. Likewise on November 10 his notes again mention "pumping mix into hole." *Id.* Mr. Anderson's daily observation report describes ECI "injecting" a grout mixture on November 11. P-98 at 121.

g. But this alone is not enough to conclude grouting caused the second leak. What it means to pump grout was not explained. Even assuming "pumping" grout means pushing it into the ground with pressure, there is no testimony in the record as to how much pressure or how much pressure would be required to invert the seal. Nor was there a credible, admissible explanation as to how the grout

inverted the seal. Simply put, there is insufficient evidence in the record to reach a non-speculative finding that the grouting to remediate the November 7 leak damaged Bradshaw's tunnel eye seal.

Grouting to Remediate the December 3 Leak

193. To address the second flooding event, ECI allowed the shaft to flood and then it drilled and grouted as it had previously done. Tr. 464:10–16 (Marshall).

194. Prior to the second grouting event, Bradshaw pumped an "extremely high viscous bentonite" to protect the MTBM. P-766; *see also* Tr. 474:15–18 (Marshall); Tr. 1796:17–1798:11 (McGinn).

195. The grout composition used on December 7 to address the second flooding event was the same composition that had been used to address the first grouting event. Tr. 465:1–3, 465:9-16 (Marshall). On December 7, Mr. Street wrote an email to Mr. Umlauf stating: "One hole drilled placed 112[]bags of Portland 9 bags bentonite, filled to water level in shaft and then will blow out calling the shaft sealed if we want the other hole please let me know I vote no I think it's sealed." D-183. According to Bradshaw, this email shows the grouting to remediate the December 3 leak had a high cement content. But Bradshaw entered this exhibit through its expert, Dr. Staheli, not Mr. Umlauf or Mr. Street. Mr. Umlauf was never questioned about the email or composition of the second grout. And Mr. Marshall was never cross-examined on this issue. Without any context for this email, I decline to give it weight. Conversely, I found Mr. Marshall's testimony credible.

196. For the second grouting, ECI drilled down over the existing pipeline and machine to inject the grout on either side of the casing. Tr. 1223:4–9 (Malm).

197. The second grouting stopped the leak. Tr. 465:17–18 (Marshall).

Bradshaw Resumes Microtunneling but Encounters Problems

198. Bradshaw resumed its microtunneling operations on December 29, 2019. D-454 at 74. On that date, Bradshaw mined sixteen feet, but reported that jacking loads were steadily going up to 200 tons. *Id.* On December 30, jacking loads continued to rise and the MTBM was returning less spoils than expected at the separation plant. *Id.* at 75.

199. By this point the Project was behind schedule. Tr. 121:3–8 (Johnson). On December 30, Mr. Johnson told Bradshaw by email that the "schedule update currently pushes ECI past our prime contract completion date by more than 30 days." P-741. Mr. Johnson requested a response by December 31 on how Bradshaw would step up its operations to fulfill its schedule and scope commitments. *Id.*

200. Mr. Johnson followed up with another email mentioning Bradshaw's "over-mining/slurry issue." *Id.* He recommended Bradshaw contact a consultant at Brierley—who Mr. Johnson said had expertise in this area—and reiterated that ECI expected a plan by December 31. *Id.*; Tr. 123:20–124:3 (Johnson).

201. Todd Brown (a Bradshaw employee) responded to Mr. Johnson's December 30 email on the evening of December 31. *See id.* He outlined a plan that included adding an additional shift of tunneling work so that Bradshaw would "proceed with two shifts, 24 hours per day, 7 days per week until the mining is complete." *Id.* Mr. Brown noted

problems with steadily increasing jacking loads and soils not staying in suspension but was optimistic these problems could be resolved. *Id.*

202. On December 31, Bradshaw mined only six feet, continuing to experience high jacking loads "no matter how we mine." D-454 at 76.

203. On January 1, 2020, Bradshaw was only able to tunnel two feet as jacking loads rose to 420 tons. *Id.* at 77.

204. This was a problem. Jacking forces reflect the amount of force needed to advance the MTBM. Tr. 246:13–16 (Johnson); Tr. 1229:4–8 (Malm).

205. The maximum capacity of Bradshaw's jacking frame was 850 metric tons. P-572; Tr. 1130:21–1131:20 (Eisold).

206. On the evening of January 1, Mr. Wanhatalo emailed Mr. Umlauf and Mr. Johnson to explain that tunneling operations continued to be very problematic. Mr. Wanhatalo wrote that Bradshaw was "frankly confounded" and had decided "to stop tunneling operations while we, and outside experts, investigate to determine the best solution." P-363.

207. On January 2, ECI, Bradshaw, and the City met to discuss the situation. P-26; Tr. 128:12–18 (Johnson).

208. Meeting attendees included: Mr. Umlauf, Mr. Street, Mr. Marshall, and Mr. Johnson for ECI; Adam Markos and Mr. Hirner from Black & Veatch; Shahin Rezania from the City of Minneapolis; Mr. Short and Justin York from Bradshaw; and Mr. Anderson from SEH. P-683; Tr. 129:6–15 (Johnson). Mr. Anderson took minutes at the meeting. Tr. 129:18–19 (Johnson).

209. During that meeting Bradshaw explained that it had ceased operations, identified various problems with its microtunneling drive, and told the other attendees that Mr. Bradshaw was flying out on Friday to investigate and come up with a plan. P-683. At this point Bradshaw was 62 feet out from the headwall and jacking loads were rising at ten tons per foot. *Id.* This was not sustainable. *See id.* The microtunnel was expected be roughly 900 feet long. J-4 at 1.

210. Mr. Bradshaw and Mr. Wanhatalo arrived on January 3 to investigate the microtunneling issues. D-454 at 79. Mr. Bradshaw tried adding bentonite to the slurry in the hopes of picking up more material and lowering the jacking loads. Tr. 1667:2–17 (Lester). But after moving eight inches the jacking loads jumped over one hundred tons and all 5,000 gallons of slurry went into the ground. Tr. 1667:13–17 (Lester). Mr. Bradshaw tried it again, but only advanced two inches before all 5,000 gallons disappeared into the ground. Tr. 1667:18–20 (Lester).

211. On January 4, Bradshaw asked ECI and the Owner/Engineer to "provide direction on how to proceed with tunneling" and advised that another differing subsurface conditions claim would be submitted. Tr. 132:23–134:8 (Johnson); D-454 at 80 ("The decision was made to cease all mining operations until ECI gives directive.").

Bradshaw Submits Its Second Notice of Differing Subsurface Conditions

212. On January 4, Bradshaw formally submitted a second Notice of Differing Subsurface Conditions to ECI. P-522. As Bradshaw explained, the notice related "to what Bradshaw believes to be voids along the tunneling alignment." *Id.*

213. Bradshaw followed up by submitting a report from an expert, Dr. Ronald Heuer, on January 8. P-298. Dr. Heuer could not identify the precise physical nature of the subsurface condition but identified three possibilities: a conventional fault/fracture zone, a sandstone karst feature, or the Saint Anthony Falls migration mechanism. P-298 at 7. But he conceded that the subsurface condition could be something different. *Id.*

214. Black & Veatch investigated and denied Bradshaw's second notice of differing subsurface conditions on February 13. P-343. Black & Veatch reviewed construction records and boring logs to assess the ground conditions in the area and had a survey conducted inside the tunnel itself for signs of a void. Tr. 770:7–772:10 (Hirner). It also examined additional records from Bradshaw, including its Slurry and Lubrication Log. Tr. 772:15–773:12 (Hirner); P-528.

January 7 Meeting

215. Another project meeting took place on January 7. This time Mr. Bradshaw attended. P-27; Tr: 139:12–141:16 (Johnson).

216. Mr. Bradshaw discussed the challenges that were preventing Bradshaw from advancing the tunnel, including a lack of cuttings, high jacking forces, and the lubrication system not being able to push lubrication to the jacking pipes. He also advised that Bradshaw planned to winterize its equipment and pull people from the site until it was provided with direction. P-27; Tr. 366:13–25 (Umlauf); Tr. 559:17–21, 561:14–25 (Anderson).

217. Mr. Anderson testified that Mr. Bradshaw told ECI and the City that "[t]here's nothing you can do. This tunnel is doomed. We'll not get this across the river.

There's no way it's going to happen." Tr. 559:5–11 (Anderson). Mr. Pfister specifically recalled Mr. Bradshaw stating that "this ground is not microtunnelable" as he struck the table for emphasis. Tr. 884:10–885:2 (Pfister).

218. The parties dispute whether the January 7 meeting minutes are accurate. On January 29, Mr. Bradshaw sent proposed corrections to the minutes for the meeting minutes. D-84. Black & Veatch declined to make any corrections. Tr. 662:9–663:3 (Markos).

219. Many of Mr. Bradshaw's objections are technical. By way of example, Mr. Bradshaw indicated that one note wrongly attributed to him the statement that his company lost 27 yards of slurry during its attempt to microtunnel. According to Mr. Bradshaw, 54 yards of 80 was lost during the second slurry. D-84; Tr. 1670:11–14 (Lester).

220. I decline to resolve Mr. Bradshaw's fourteen corrections on an item-by-item basis. Rather, his objections and testimony have been considered in weighing the evidence as a whole.

221. However, I find that the following three notes recorded in the minutes are consistent with other evidence in the record and true:

a. "Bradshaw was stopping working on their own accord because there is only 10-12 feet left before the machine is under the river and they don't want to get into an unrecoverable situation";

b. "[Bradshaw is] [a]sking for direction because they have exhausted their ideas"; and

c. "Bradshaw currently plans to winterize equipment and pull people from project." P-27 at 2–3.

Herrenknecht Visit

222. On January 14, ECI notified Bradshaw that it had coordinated with Herrenknecht, the manufacturer of Bradshaw's MTBM, to conduct an inspection of the machine. P-633; Tr. 164:3–23 (Johnson).

223. Mr. Anderson was present when Herrenknecht's representative, Manny Kauffmann, evaluated the MTBM. He and a Bradshaw employee shadowed Mr. Kauffmann and observed as he operated and worked on the machine. P-98 at 218–20; Tr. 562:8–563:15 (Anderson). Mr. Kauffmann examined all of Bradshaw's equipment, its processes, its operations, and its data logs, and he tested the slurry, the bentonite, the equipment, the jacking equipment, and the machine. Mr. Malm explained to Mr. Kauffmann what Bradshaw was seeing. Mr. Kauffmann also observed Mr. Malm operate the MTBM. Tr. 1235:10–1236:12 (Malm).

224. Mr. Kauffmann, who did not speak fluent English, prepared a written report after his site visit. *See* J-33. Mr. Kauffmann reported that the MTBM was in good working order. He found the problems Bradshaw was encountering unusual and was unable to provide direction on how to make progress. J-33 at 13.[11]

[11] Mr. Kauffmann did not testify at trial, nor was his deposition read into the record. Although his report was entered into evidence, it will not be considered for the truth of the matters asserted. Similarly, testimony from Mr. Malm regarding statements made by Mr. Kauffmann during his visit will not be relied upon for the truth of the matters asserted.

Notices of Deficiency

225. On January 18, Mr. Johnson emailed Mr. Bradshaw to advise him that ECI was placing Bradshaw's surety on notice of potential default. P-767.

226. On January 20, ECI advised Bradshaw's surety (Travelers) that ECI was "considering declaring a Contractor Default under the Subcontract and Bond," and, in accordance with the bond's requirements, requesting a prompt meeting "to discuss among other things, the methods of Bradshaw performing under the Subcontract." P-643 at 2; *see* Tr. 178:20–179:13 (Johnson).

227. On January 21, ECI, through its attorneys, sent Bradshaw a written notice of deficiency. In its notice, ECI claimed that "Bradshaw is refusing to perform the Work and has not proposed a path forward to resume." P-667 at 1. ECI further notified Bradshaw that its failure to cure these deficiencies within five days "will constitute a material breach under the Subcontract." P-667 at 2.

228. Another Project meeting was held on January 23. At that meeting, Mr. Bradshaw told everyone that Bradshaw would lose jacking capacity in less than 20 feet and that they should have no hope in getting a microtunnel across the river. P-29 at 2.

a. The meeting minutes are corroborated by testimony from Mr. Pfister, Mr. Marshall, Mr. Anderson, and Mr. Markos. Tr. 887:11–888:6 (Pfister); Tr. 569:1–25 (Anderson); Tr. 471:7–16 (Marshall); Tr. 661:20–25 (Markos).

b. Although Mr. Bradshaw testified that he was not trying to say there was no hope, Tr. 1678:7–1679:6 (Lester), I am persuaded by contrary testimony that

Mr. Bradshaw conveyed to the City and ECI that they should have no hope in getting a microtunnel across the river, regardless of his precise words or intentions.

c. Mr. Wanhatalo's testimony that he did not recall Lester making this statement was not persuasive. Tr. 1351:9–1353:16 (Wanhatalo). For reasons explained in relation to resolving other factual disputes—including his memory and demeanor—I did not find his testimony a credible basis to conclude what was said at the meeting. Regardless, his account is outnumbered by four credible witnesses.

Bradshaw's Tunnel Action Plan

229. On January 24, 2020, Bradshaw sent ECI a "Tunnel Action Plan," under which Bradshaw proposed to begin tunneling activities on January 27. In that Tunnel Action Plan, Bradshaw acknowledged that it had "no choice but to attempt to continue mining as we do not wish to be found in breach of contract by ECI." P-572 at 4; *see also* P-540 at 3.

230. Bradshaw's Tunnel Action Plan included the following statements: (1) "Should the microtunneling continue in the manner in which we found to advance with the unusual exponential increase in jacking loads there is a high probability that the MTBM may get stuck under the river and thus making it harder to recover"; (2) "any attempts at further mining will only lead to failure to advance the tunnel to completion, incur greater costs to no end," and "make recovery of the MTBM equipment more difficult and costly"; and (3) "as we approach maximum thrust loads, we have great concern about safety of the personnel who must be below ground to operate the MTBM system." P-572 at 4–5.

231. The basic problem was that Bradshaw's tunnel action plan warned it would fail. Tr. 172:16–176:10 (Johnson); Tr. 371:15–23 (Umlauf); Tr. 805:10–807:23 (Hirner); Tr. 889:14–890:9 (Pfister).

232. Black & Veatch received the Tunnel Action Plan on a Friday and advised Bradshaw that a few days were needed to evaluate the plan. Bradshaw was told not to proceed with an unsafe plan. Tr. 666:16–667:2 (Markos).

233. Bradshaw restarted its microtunneling activities on January 27. P-648; Tr. 176:11–177:21 (Johnson).

234. That same day, ECI's attorney sent a letter to Bradshaw's attorney, instructing Bradshaw to stop mining. In particular, the letter described work performed under Bradshaw's Tunnel Action Plan to be "hastened, reckless, and unsafe." P-648.

235. I find that the tunnel action plan was not a serious plan to continue mining. And I find that Bradshaw did not expect the tunnel action plan to succeed.

a. Bradshaw disputes the viability of the tunnel action plan. For example, Mr. Eisold testified that the action plan was reasonable, not reckless or unsafe. Tr. 1137:16–1138:8 (Eisold). And Mr. Bradshaw testified that the plan was not unsafe in any manner. Tr. 1681:12–1683:1 (Lester).

b. I am not persuaded that the plan was reasonable or a serious attempt to continue mining. On its face the plan warned that it would likely fail and raised safety concerns. P-572 at 4–5. And Bradshaw had already made several attempts to stop the jacking forces from increasing without success. Tr. 1667:2–20 (Lester). Herrenknecht couldn't figure out a path forward either. *See* J-33. As Bradshaw had

previously told ECI and the City, it was "frankly confounded." P-363. Meanwhile, ECI was threating to terminate Bradshaw without providing direction on how Bradshaw could make progress. P-667. This left Bradshaw was frustrated. Tr. 1676:24–1677:24 (Lester). As I see it, this plan was Bradshaw resuming tunneling under protest; warning that resuming tunneling was a bad idea and that Bradshaw—after seriously attempting to figure out what was going on—was out of ideas.

236. ECI had another in-person discussion with Mr. Bradshaw at the end of January. The meeting was held at the offices of ECI's attorney and was attended by Mr. Johnson, Mr. Bradshaw, and their respective legal counsel. During the meeting, Mr. Bradshaw advised that microtunneling was the "wrong means and methods," which means that "microtunneling was the wrong solution to cross the river and tunnel underneath the river." Tr. 177:22–178:19 (Johnson).

237. Black & Veatch issued a formal response to Bradshaw's Tunnel Action Plan on February 14, asking for corrections to the plan. P-260; Tr. 667:14-671:11 (Markos). According to Black & Veatch, Bradshaw never submitted a credible tunnel action plan. Tr. 671:9–11 (Markos); Tr. 807:21–23 (Hirner).

238. On February 20, Bradshaw conducted a test at the Project site that resulted in the water, sand, and bentonite entering the launch shaft. Bradshaw personnel attempted to perform a flow test by opening the doors to the MTBM to allow water into the launch shaft so that Bradshaw could measure the volume of the water coming in at the tunnel head. Tr. 1144:1–1145:7 (Eisold); Tr. 1358:14–23 (Wanhatalo). Bradshaw had not obtained

permission from ECI to conduct this flow test and had not provided notice to ECI or the City. J-34 at 37; Tr. 469:18–470:9 (Marshall); Tr. 573:20–574:13, 575:8–9 (Anderson).

239. Bradshaw did not inform anyone of the test because "by that time the relationship between ECI and Bradshaw had deteriorated to the extent that we did not think that they would even let us do it." Tr. 1195:20–25 (Eisold). This flood test further damaged Bradshaw's already strained relationship with ECI and the City. Tr. 895:12–896:25 (Pfister).

240. On that date, Bradshaw reported measuring flow rates ranging from 607 gallons per minute to 779 gallons per minute. D-91.

ECI Terminates Bradshaw at the City's Direction

241. On February 18, ECI, through its counsel, advised Bradshaw and its surety that Bradshaw's second claim for differing subsurface conditions had been denied and that Bradshaw had not provided a satisfactory cure to ECI's Notice of Default. P-644; Tr. 180:8–18 (Johnson).

242. On February 20, ECI, through its counsel, sent another letter to Bradshaw and its surety documenting the parties' February 20 phone conference, further detailing the denial of Bradshaw's claims for differing subsurface conditions, advising Bradshaw that it should not take any steps to remove equipment from the project site, and demanding that it preserve all evidence in anticipation of litigation. P-645; Tr. 180:24–181:18 (Johnson).

243. On February 25, the City issued a Notice of Request for Replacement Microtunneling Subcontractor to ECI in accordance with section 7.06(E) of the General Conditions. P-652; Tr. 182:3–183:17 (Johnson).

244. By issuing this notice, the City directed ECI to terminate Bradshaw from the Project and to replace Bradshaw with a new subcontractor capable of completing the microtunneling scope of work. P-652 at 1.

245. In its notice, the City stated it was not waiving any claim or remedy under the Contract, including the right to recover "any damages arising from or related to Contract Price of Contract Time adjustments made pursuant to Section 7.06(F)." P-652 at 2.

246. On February 26, ECI terminated Bradshaw. ECI claimed to terminate Bradshaw in accordance with paragraph 9 of the Subcontract, asserting that Bradshaw had materially breached the Subcontract. P-646; Tr. 184:11–185:8 (Johnson).

247. Bradshaw's surety was copied on the termination letter and ECI demanded payment in accordance with the terms of the performance bond. P-646 at 2; Tr. 185:14–16 (Johnson); P-100; Tr. 185:17–186:11 (Johnson).

248. As of February 26, Bradshaw had tunneled seventy-five to eighty feet. Tr. 1708:7–9 (Lester).

249. From the time Bradshaw started tunneling through when it was terminated, Bradshaw never sought a change order in accordance with the Contract Documents. Tr. 188:11–21 (Johnson); Tr. 1709:5–9 (Lester).

250. From November 7 through Bradshaw's termination, it did not present any excuses for its inability to tunnel other than the differing subsurface conditions. 1709:5–22 (Lester).

ECI Decides to Self-Perform the Microtunneling Drive

251. Following ECI's termination of Bradshaw, ECI sought a replacement subcontractor to perform the microtunneling work. Tr. 189:11–13 (Johnson).

252. ECI contacted around six microtunneling contractors from around the country, but only two contractors expressed preliminary interest in the Project. Tr. 189:14–25 (Johnson). Of those two contractors, one (Bessac) visited the Project site but then did not submit a bid, *see* Tr. 189:21–190:5 (Johnson), and the other (Ward & Burke) submitted a proposed work plan that differed extensively from the Project's existing plan. Tr. 190:8–191:9 (Johnson). Ward & Burke's plan would have required the construction of a new retrieval shaft on the West Bank and the bid cost exceeded $7 million. Tr. 373:9–20 (Umlauf); Tr. 966:2–13 (Gentry). Other concerns included COVID-19's impact on travel and scheduling—Ward & Burke was based in Canada. Tr. 191:17–192:1 (Johnson); Tr. 376:7–21 (Umlauf).

253. Having failed to find a satisfactory microtunneling subcontractor, ECI prepared its own microtunneling proposal. *See* P-548 (dated March 2020); Tr. 192:4–24 (Johnson). ECI presented to the City a "Schedule of Values," which laid out the budget remaining for the Project and included an accounting of ECI's projected costs to complete the remedial microtunneling drive pursuant to its proposed plan. P-432 (Schedule of Values); Tr. 198:18–200:6 (Johnson), 374:6–375:15 (Umlauf).

254. Under its plan, ECI proposed to perform the microtunneling work itself, together with a team of specialists that ECI would assemble. Tr. 192:25–193:3 (Johnson); Tr. 808:8–25 (Hirner). Specifically, under ECI's microtunneling work plan:

a. ECI—while continuing to serve as general contractor—would provide the microtunneling labor. *See* P-548 at 2; Tr. 193:4–9 (Johnson).

b. Akkerman—a Minnesota-based manufacturer of microtunneling equipment—would supply the microtunneling machine, other microtunneling equipment, and the shaft seals, and would provide microtunneling technicians and operators who would supervise the operations and provide on-site technical support. *See* P-548 at 2; Tr. 193:10–15 (Johnson).

c. Clean Slurry Technologies would supply equipment and personnel to operate the slurry tank (also referred to as a slurry separation plant), where slurry returning from the MTBM is separated from the cuttings that were carried out from the MTBM. *See* P-548 at 2; Tr. 193:16–21, 194:9–14 (Johnson).

d. Drilling Mud Direct would design and operate ECI's slurry program—meaning it would supply the materials and additives for ECI's slurry mix and provide a dedicated mud engineer who would modify ECI's slurry mix throughout the microtunneling operation. *See* P-548 at 2; Tr. 193:22–194:3, 194:15–195:9 (Johnson).

255. ECI proposed to begin its tunneling drive ten vertical feet above Bradshaw's tunneling alignment. *See* Tr. 195:25–196:8 (Johnson). To do that, ECI proposed to place concrete in the bottom of both the launch shaft and the retrieval shaft to raise the floor of the shaft ten feet in elevation. *See* P-548 at 3 ("Place 3,000 PSI concrete in the shaft to raise the existing slab 10-feet."). ECI then would install new seals on the shaft wall for both the launch shaft and the retrieval shaft. Tr. 196:9–14 (Johnson); *see also* P-548 at 3.

256. ECI learned lessons from Bradshaw's microtunneling drive. For example, one of the problems Bradshaw had faced was returning enough cuttings to the surface. According to Bradshaw's slurry and lubrication log, Bradshaw mostly used water without additives:

BRADSHAW CONSTRUCTION CORPORATION — TUNNELING SPECIALISTS

Job #598- 10th Ave, 60" Permalok Steel Casing by Microtunneling. — SPOIL, LUBRICATION AND SLURRY LOG

Total Job Length: 896

Total Drive Length: 896

Date	Feet	Mined To Date (ft)	Remain (ft)	% Complete	% Remain	Calculated Spoil CY	Spoil at Plant	ABS Lube Liters	Express Line Liters	Total Liters Lube	Slurry Used	Additive
11/7/2019	17	17	879'	2%	98%	13.4	13.4	0.0	0.0	0.0	Water	
11/23/2019	14	31	865'	3%	97%	11.1	4.0	0.0	0.0	0.0	Water	
12/3/2019	14	45	851'	5%	95%	11.1	4.0	2,529.0	2,840.0	5,369.0	Water	
12/29/2019	16	61	835'	7%	93%	12.6	6.0	1,565.0	0.0	1,565.0	Water	
12/30/2019	2	63	833'	7%	93%	1.6	0.3	1,135.0	0.0	1,135.0	45sec	No-Sag
12/31/2019	5	68	828'	8%	92%	4.0	1.0	2,667.0	9,175.0	11,842.0	Water	
1/1/2020	2	70	826'	8%	92%	1.6	0.3	3,734.0	0.0	3,734.0	Water	
1/2/2020	0	70	826'	8%	92%	0.0	0.0	227.0	15,000.0	15,227.0	Water	
1/3/2020	0	70	826'	8%	92%	0.0	0.0	461.0	15,000.0	15,461.0	Water	
1/4/2020	1	71	825'	8%	92%	0.8	0.3	715.0	765.0	1,480.0	70-80sec	
1/14/2020	1	72	824'	8%	92%	0.8	0.3	998.0	0.0	998.0	Water	
1/15/2020	4	76	820'	8%	92%	3.2	1.0	51.0	0.0	51.0	60sec	
	76	To Date						% Muck Return				
					TOTAL	60.0	30.4	51%	Spoil	56,862.0	Liters	
							13.4	100%	Frozen	74.3755	CY	
							17.0	36%	Natural			

Bentonite used - Bore-Gel

Lubrication mix design - 100lbs of bentonite w/ 450 liters of water, Over 100 second viscosity.

No-Sag additive- 2lbs No-Sag, 50lbs Bentonite, 450 liters of water added to lubricant only.

P-528 at 14; *see also* Tr. 1243:21–1244:7 (Malm); Tr. 709:13–712:5 (Hirner).

257. ECI's work plan included a detailed "Conceptual Slurry and Lubrication Program," which was described in ECI's proposal:

> ECI has worked with Mud Direct to develop a draft slurry and lubrication program. Critical elements include the use of soda ash to modify the pH of the bentonite slurry to allow for maximum sandstone spoils recovery. Mud Direct will have experienced Mud Engineers on site full time during startup and microtunneling to provide quality control of the slurry and lubricant. Mud Engineers will work with ECI to develop real time modifications to slurry and lubricant based on continual

> sampling and testing data. The draft plan is included for further review.

P-548 at 11.

258. ECI's slurry program and addition of a "mud engineer" was an attempt to control the sandstone at the heading of the tunneling machine. Tr. 1770:15–1771:20 (McGinn). In part, the goal was to return a higher percentage of spoils to prevent cuttings from being pushed into the annular space around the casing pipe. Tr. 712:14–715:8 (Hirner), 1767:16–1769:14 (McGinn).

259. The City accepted a final version of ECI's proposed work plan. Tr. 198:5–9 (Johnson). And the City approved a change order increasing ECI's total contract sum by $2,583,041, in exchange for ECI agreeing to undertake the microtunneling scope of work and then pursuing recovery from Bradshaw to pay the City back. *See* P-97 at 1, 3; Tr. 902:15–903:17 (Pfister); Tr. 200:7–25 (Johnson).

ECI Completes the Microtunneling Drive

260. Bradshaw demobilized its equipment from the Project in April 2020. P-98 at 423, 427; Tr. 577:13–578:4 (Anderson).

261. From April to June, ECI drilled freeze pipes for the second ground freeze around the launch shaft, poured concrete to elevate the slabs of both the launch shaft and the retrieval shaft, and constructed a new tunnel portal/headwall in the launch shaft. Tr. 578:5–579:11 (Anderson); P-98 at 434 ("We observed the concrete placement for the Microtunneling Machine Abandonment Backfill today."), 453 ("ECI placed 119 yards of G0310 (CLSM) today for the working shaft bottom raising it approximately 4 feet."), 543

("ECI had seven laborers on-site performing preparation of the concrete reacton [sic] wall and frame.").

262. Initially, ECI's plan set a June 11 start date for its microtunneling drive. P-132 at 6. But several delays occurred, including problems refreezing the launch shaft. D-112; Tr. 395:18–399:16 (Umlauf). These delays were caused, in part, by ECI trying to minimize costs associated with the additional freezing effort. Tr. 398:21–23 (Umlauf); D-112. On June 1, the launch shaft flooded after a plug came out of the sidewall in front of the shaft. Tr. 638:5–8 (Anderson); P-98 at 485. Water entered the launch shaft through "observation plugs around the portal" where ECI had drilled to check for water transmission. *See* P-98 at 485.

263. On July 25, ECI and Akkerman set the MTBM lead section to advance the cutterhead past the seal. However, as the MTBM was pushed, the rubber seals tore at the launch shaft. D-117; Tr. 401:1–402:2 (Umlauf). As a result, ECI had to obtain replacement seals which were delayed by several days. D-117; Tr. 402:5–19 (Umlauf).

264. There were also problems with the retrieval shaft. For example, on July 14, Umlauf notified the City that it was pushing back the start of microtunneling because of water present at the face of the retrieval shaft. D-121.

265. ECI began its microtunneling drive on July 31, 2020. Tr. 203:21–25 (Johnson); P-98 at 601; *see also* Tr. 581:9–12 (Anderson).

266. ECI used bentonite to pressurize the annular space throughout the entire microtunneling drive. Tr. 715:22–716:14 (Hirner); Tr. 1769:20–1770:3 (McGinn); Tr. 1839:10–12 (Staheli).

267. Throughout its microtunneling drive, ECI used a mud engineer to monitor and modify the chemical composition of ECI's slurry mix. Tr. 1770:15–1771:2 (McGinn).

268. ECI reached the retrieval shaft—tunneling nearly 900 linear feet—by August 14. Tr. 204:12–18 (Johnson); P-98 at 646; *see also* Tr. 583:2–20, 585:17–18 (Anderson).

269. During the drive ECI encountered some minor problems. For example, on August 5, an intermediate jacking station disconnected and ECI had problems with the MTBM's slurry lines. This resulted in a ten-hour delay. D-466 at 7; Tr. 494:12–22 (Marshall). On August 8, a coupler breaking in the MTBM's booster pump resulted in a nine-hour delay. D-469, Tr. 497:12–16 (Marshall). Overall, these delays during the microtunneling drive itself were relatively insignificant and tunneling proceeded smoothly. *See, e.g.*, Tr. 585:19–586:14 (Anderson) (describing the team as "an A+ crew").

Problems at the Retrieval Shaft

270. Laser measurements confirmed that the MTBM was on track for most of ECI's microtunneling drive. Tr. 583:24–584:21 (Anderson).

271. Although ECI's MTBM reached the retrieval shaft, it could not enter shaft because the front of the MTBM became caught on the retrieval shaft's thimble, which is located just outside the retrieval shaft. Tr. 205:6–13 (Johnson); Tr. 585:14–16 (Anderson).

272. The Akkerman MTBM used a "stabilizing fin"—also referred to as a "dirt wing"—that became damaged during ECI's microtunneling operation and prevented the MTBM from entering the retrieval shaft. Tr. 205:14–206:2 (Johnson); Tr. 584:22–585:1 (Anderson) ("As we advanced, we cut through the concrete face wall of the thimble area, and what happened was in the last, you know, few feet it seemed to rotate up to the right

just slightly."). As Mr. Umlauf explained in an email to the City, the MTBM head was approximately six to nine inches off-line in the thimble and it appeared that some debris or object was forcing the lead section of the MTBM to the right of the thimble. P-134 at 1; Tr. 285:25–286:11 (Johnson).

273. Mr. Hirner testified that this was a contractor problem but didn't opine whether Akkerman or ECI was responsible. Tr. 855:23–856:12 (Hirner).

274. ECI tried for months to safely advance the MTBM into the retrieval shaft without success. Tr. 205:14–206:14 (Johnson).

275. ECI then hired Keller Industrial, Inc. to freeze the ground outside the retrieval shaft. Tr. 287:7–288:22 (Johnson). Despite Keller's ground freeze, the tunnel flooded again in January 2021. Tr. 287:7–288:22 (Johnson). ECI unsuccessfully attempted to retrieve Akkerman's MTBM for months. Tr. 380:16–381:5 (Umlauf).

276. ECI eventually left the MTBM in place, removed the valuable internal components, and effectively used the MTBM's casing as the final segment of pipe for the tunnel. Tr. 206:3–9 (Johnson). ECI achieved substantial completion on October 15, 2021. Tr. 206:19–20 (Johnson).

277. By letter dated December 21, 2021, the City assessed damages against ECI in the amount of $2,902,411, including $2,815,000 in liquidated damages and two invoices from American Engineering Testing totaling $87,411. P-761; *see also* Tr. 990:5–991:12 (Gentry).

278. The City's liquidated damages assessment of $2,815,000 is based on a 563-day delay at the Prime Contract's $5,000 per day rate as set forth in section 18.09 of the Supplemental Conditions. J-4 § 18.09; P-761.

279. ECI has not paid the City for any amount of liquidated damages despite admitting responsibility for part of the 563-day delay. Tr. 304:2–6 (Johnson).

What Went Wrong with Bradshaw's Microtunneling Drive

Slurry Composition

280. The parties agree that Bradshaw was not excavating the expected yield of cuttings during its microtunneling drive. Bradshaw created a production log tracking this problem and other information about its microtunneling drive. *See* P-528 at 14. The production log calculates the expected volume of cuttings in cubic yard—based on the theoretical volume of the tunnel for a given distance advanced—and records the volume of cuttings measured at the separation plant. Tr. 710:21–711:7, 713:7–714:3 (Hirner) (discussing P-528); P-528 at 14.

281. On behalf of ECI, Mr. Hirner testified as an expert on this lower-than-expected-yield issue. Mr. Hirner obtained his Bachelor of Science in geological engineering in 1994. Tr. 695:23–696:11 (Hirner). He is a geological engineer licensed as a professional engineer in Kansas. Tr. 696:14–20 (Hirner). Since becoming a professional engineer, he's worked on the underground components of several projects, including dams and tunnels. Tr. 697:3–17 (Hirner). He has published fifteen to twenty papers related to

tunneling, microtunneling, and grouting. Tr. 698:11–16 (Hirner). And Mr. Hirner has worked on roughly ten microtunneling projects. Tr. 699:9–17 (Hirner).[12]

282. Mr. Hirner opined that Bradshaw's slurry composition explains its failure to return the expected yield of cuttings and contributed to the high jacking forces during Bradshaw's microtunneling drive. According to Mr. Hirner, once the MTBM advanced past the frozen ground, Bradshaw's water-only slurry was ineffective at returning the sand to the slurry separation plant. Tr. 712:14–23 (Hirner). That's because the sand (St. Peter Sandstone) was not effectively held in suspension by the water. Tr. 712:24–713:1 (Hirner).

283. Mr. Hirner opined that instead of being held in suspension by the slurry and excavated out of the tunnel, the cuttings were pushed in the ground in and around the casing. Tr. 713:4–6 (Hirner). This resulted in cuttings entering the annulus, increasing jacking forces and limiting the space for lubrication to be pumped around the casing. Tr. 714:11–715:21 (Hirner).[13]

284. Mr. Hirner opined that adding bentonite to Bradshaw's slurry would have helped the sand stay in suspension. Tr. 713:2–3 (Hirner). He testified that ECI's use of bentonite in its slurry (during its microtunneling drive) resulted in the more effective return

---

[12] As a reminder, Hirner was the lead tunneling engineer on the Project assigned by Black & Veatch. As the lead tunneling engineer, he was responsible for the Baseline Report, Data Report, and the design of the Project. Tr. 704:16–24 (Hirner).

[13] As a reminder, the cutterhead is slightly larger than the rest of the MTBM and the trailing casing pipe. So as the MTBM advances, it leaves a gap around the casing pipe. That gap is called the annulus. Tr. 715:3–8, 831:1–8 (Hirner).

of cuttings to ECI's separation plant. Tr. 716:1–14 (Hirner).[14] In turn, this partially explains why ECI's drive didn't experience the high jacking forces encountered on Bradshaw's microtunneling drive.

285. I am persuaded, and therefore find, that Bradshaw's use of water-only slurry substantially contributed to the failure of Bradshaw's microtunneling drive by not effectively excavating the St. Peter Sandstone. In turn, sand narrowing the annular space increased Bradshaw's jacking loads.

a. I found Mr. Hirner's testimony credible and persuasive. His explanation was clear, comprehensible, and supported by the evidence. Bradshaw never seriously disputed at trial that bentonite slurry is more effective than water at excavating St. Peter Sandstone. *See, e.g.*, Tr. 1681:7–11 (Lester). And as Mr. Hirner explained, this difference can substantially account for ECI's tunneling drive that successfully advanced through the same subsurface. *See* Tr. 716:1–14 (Hirner).

b. Dr. McGinn likewise testified that mining with a bentonite slurry allowed ECI to effectively remove sand from the cutter head and bring it back to the shaker table. *See* Tr. 1770:4–7 (McGinn). Dr. McGinn's testimony credibly corroborates Mr. Hirner's opinion.

c. Mr. Hirner's opinion is also consistent with Bradshaw's lubrication log. *See* P-528 at 14. Bradshaw returned the expected value of cuttings when

[14] Neither party proposed factual findings regarding the expected and actual yields of cuttings during ECI's microtunneling drive. Nor have I found specific evidence of such yields in the trial record.

mining through the frozen ground, *see* P-528 at 14 (13.4 cubic yards out of 13.4 cubic yards), but never subsequently returned the expected yield of cuttings. Dr. Staheli claims that this loss of cuttings is evidence of voids. *See* Tr. 1501:1–5 (Staheli). But this consistent failure to return the expected yield of cuttings across sixty to seventy feet is more consistent with Mr. Hirner's water-only-slurry theory than the presence of voids along that entire section of tunnel.

d. The difference in the actual yield of cuttings when comparing ECI and Bradshaw's microtunneling drives further supports Mr. Hirner's theory. *See* Tr. 716:1–14 (Hirner). After all, ECI tunneled through the same subsurface ten feet above Bradshaw's tunneling alignment.

e. When asked about Mr. Hirner's theory at trial, Dr. Staheli seemed to disagree. Tr. 1550:17–25 (Staheli). But I do not understand her subsequent testimony about bentonite not being meant to stabilize the face of the machine and bentonite in the annulus being a separate system as directly responsive to Mr. Hirner's theory. *See* Tr. 1551:1–1552:4 (Staheli). Therefore, Dr. Staheli's disagreement was not persuasive.

f. Moreover, Dr. Staheli agreed that narrowing the annular space—also called the overcut—increases jacking forces. *See* Tr. 1485:12–19 (Staheli). For example, she testified that once the annulus gets smaller than a quarter inch an MTBM could not be advanced further than one hundred feet into the ground. Tr. 1865:15–1866:4 (Staheli).

Time and Pressurizing the Annulus with Bentonite

286. Dr. McGinn opined on other factors that contributed to increasing jacking forces. He testified that sand started flowing into the annular space as soon as Bradshaw left the freeze wall. Tr. 1793:10–13 (McGinn). As Dr. McGinn explained, this disturbed sand flowed into the annular gap, increasing jacking forces as sand pressed against the pipe casing. Tr. 1793:15–23 (McGinn).

287. Dr. McGinn opined that Bradshaw should have pressurized the annular space using bentonite as soon as it left the freeze wall. Tr. 1795:5–9 (McGinn). According to Dr. McGinn, maintaining a positive pressure of bentonite would prevent the subsurface from collapsing onto the pipe. Tr. 1768:5–11 (McGinn). It would have also prevented—or at least mitigated—groundwater from flowing along the annulus when a leak developed in the launch shaft. Tr. 1769:2–14 (McGinn). Because St. Peter Sandstone is weakly cemented and flows when disturbed, maintaining this pressurized bentonite in the annulus would have helped control the subsurface conditions. Tr. 1768:5–11, 1798:21–1799:19 (McGinn).

288. Relatedly, Dr. McGinn opined that jacking forces increased because the machine sat in St. Peter Sandstone over time. Tr. 1795:18–25 (McGinn). Here, the machine did not advance for much of November or December before encountering high jacking forces in late December and early January. *See* P-528 at 14 (log that includes distances advanced).

289. Unlike Bradshaw, ECI started its microtunneling drive by pressuring the annulus with bentonite and other additives. Tr. 1769:20–1770:3 (McGinn). Dr. McGinn

opined that this control, combined with the use of a bentonite slurry, explains why ECI's microtunneling drive reached the retrieval shaft while Bradshaw's microtunneling drive encountered high jacking forces. Tr. 1769:20–1770:14 (McGinn).

290. I was not persuaded by Dr. Staheli's rebuttal on these issues. For example, when responding to Dr. McGinn's claim that Bradshaw should have pressurized the annulus with bentonite, she countered that "[Bradshaw] followed the standard means and methods, industry standard, you know, of care for microtunneling. They didn't do anything odd." Tr. 1845:11–18 (Staheli). Whether Bradshaw followed the standard means and methods or industry standard is different than the factual question of what caused the high jacking forces during its microtunneling drive.

291. Dr. Staheli also testified that it is not standard to fill the annulus with bentonite from the beginning because this lack of pressure could cause the machine to roll. Tr. 1835:23–1836:21, 1843:8–12 (Staheli) ("In fact, the sand falls down on the pipe in that first 50 to 70 feet to give it the frictional resistance to rotation."). And she went on to explain: "Why did [ECI] do it here? [ECI] did it here because they learned lessons on the previous drive that something was going awry." Tr. 1836:25–1837:7 (Staheli). Fair enough. But this doesn't refute Dr. McGinn's factual, causal analysis. Rather, her testimony that ECI "learned lessons" from Bradshaw's drive supports his opinion that pressurizing the annulus with bentonite helps explain why ECI's microtunneling drive made it to the retrieval shaft while Bradshaw's microtunneling drive got stuck.

292. Therefore, I find that sand flowing into the annular gap and locking around the pipe casing over time substantially contributed to the high jacking forces encountered

during Bradshaw's microtunneling drive. I also find that pressurizing the annulus with bentonite would have mitigated these problems.

Karstic Conditions

293. Bradshaw claims it encountered karstic conditions, also called voids. As a reminder, "[a] karstic condition is one where there's essentially been a hole develop in a rock formation." Tr. 764:20–25 (Hirner); Tr. 1499:6–10 (Staheli) ("A karstic material is a material that has solution cavities in it. They can be very big like caves. They can be small. They just wind through.").

294. As a preliminary matter, the parties dispute whether St. Peter Sandstone collapses or bulks up when disturbed and excavated. This is relevant to karstic conditions because Bradshaw contended that the failure to return the expected yield of cuttings is evidence of voids. *See* Tr. 1498:23–1499:5, 1501:1–4 (Staheli) ("[S]o losing 61 percent of the soil after the flooding events makes it -- ensures that it went into some kind of void."). By contrast Dr. McGinn opined that the failure to return the expected yield is partially explained by the loss of volume when St. Peter Sandstone is disturbed. *See* Tr. 1767:5–9 (McGinn) ("So that's the explanation for why they're removing less material than they think they're removing.").

295. Dr. Staheli testified that when St. Peter Sandstone is disturbed, "you get a volume of sand that now has rearranged its particles, so it grows." Tr. 1497:11–19 (Staheli). She described the sand as finely packed marbles. Tr. 1495:21–1496:20 (Staheli). Because the sandstone is densely packed, Dr. Staheli opined that you should see "the whole amount come back, plus 20 percent, [or] plus 30 percent." Tr. 1497:20–23 (Staheli). In

other words, if the expected yield of excavated St. Peter Sandstone was ten cubic yards, Dr. Staheli claims the actual yield at the separation plant should be twelve or thirteen cubic yards.

296. Dr. McGinn disagreed. He testified that when St. Peter Sandstone is disturbed it collapses, rather than bulking. Tr. 1758:15–20 (McGinn). He described undisturbed St. Peter Sandstone as a house of cards. Tr. 1763:1–16 (McGinn). In between the bonds that hold the cementitious material together is void space. Tr. 1763:1–16 (McGinn). He opined that when these bonds are broken, the St. Peter Sandstone collapses in upon itself, losing volume. Tr. 1806:9–14 (McGinn). According to McGinn, "the void ratio is on the order of .4. If you're looking at a loose material that's loose sand that's at the heading, that void ratio is on the order of .33." Tr. 1806:23–1807:4 (McGinn). He testified that the loss of volume depends on the angularity and composition of the sand. Tr. 1807:3–4 (McGinn).

297. I find that St. Peter Sandstone collapses, rather than bulks, when disturbed.

a. Dr. McGinn's testimony was persuasive and credible. He was measured, direct, and thoughtful. Dr. McGinn has extensive experience with St. Peter Sandstone, having worked on ten subsurface projects involving the subsurface material. Tr. 1753:3–5 (McGinn). And he testified that St. Peter Sandstone was the primary reason Brierley has an office in the Minneapolis–St. Paul area. Tr. 1751:19–21 (McGinn). He also testified that he's worked on projects remediating or controlling the collapsing nature of St. Peter Sandstone. *See* Tr. 1752:13–1753:2

(McGinn). Based on his extensive experience, I was persuaded that he had the better understanding of St. Peter Sandstone.

b. Conversely, Dr. Staheli's testimony was not persuasive. She has never worked in St. Peter Sandstone, nor has she worked on any projects in Minnesota. Tr. 1516:20–25 (Staheli). Nothing in her testimony adequately explained her confidence that St. Peter Sandstone would increase in volume despite her lack of familiarity with the material. And the mechanics of her scientific explanation lacked persuasive foundation.

298. Having concluded that excess material was pushed into the annular space or subsurface, or accounted for by St. Peter Sandstone losing volume, I do not conclude that this failure to return the expected yield of cuttings is evidence of voids.

299. When considering the remaining evidence in the record, I find that Bradshaw did not encounter karstic conditions.

a. Mr. Hirner reviewed all the borings in the Data Report and did not find any evidence of voids or karstic conditions. *See* Tr. 770:9–771:2 (Hirner). ECI also reviewed the borings and did not observe any evidence of voids. Tr. 138:16–20 (Johnson). Moreover, ECI did not encounter any voids while excavating the launch shaft. Tr. 138:6–11 (Johnson); Tr. 770:9–17 (Hirner). As a reminder, the launch shaft was thirty feet in diameter and seventy feet deep, excavated adjacent to Bradshaw's microtunneling drive. Tr. 138:8–15 (Johnson). A LiDAR survey was also conducted. Tr. 771:3–10 (Hirner). A LiDAR survey is a kind of 3D rendering that could identify a slump or deflection if Bradshaw's MTBM had hit a

large void. Tr. 771:11–772:4 (Hirner). The results of that LiDAR survey did not show any indication that a void had been encountered. *See* Tr. 772:7–10 (Hirner). After reviewing all the evidence, Mr. Hirner concluded there was no data indicating the presence of voids in the sandstone. Tr. 774:6–7 (Hirner). Finally, Mr. Hirner opined that ECI's microtunneling drive five feet above Bradshaw's intended alignment "did not show any indications of karstic conditions." Tr. 776:11–17 (Hirner). He explained that ECI's microtunnel was effectively a large horizontal boring through similar subsurface conditions to Bradshaw's microtunneling drive. Tr. 776:18–777:1 (Hirner).

b. I found Mr. Hirner's testimony persuasive and credible. He explained his investigation and conclusions step-by-step in a direct, measured manner. And the basis for his conclusions was clear and supported.

c. Dr. Staheli testified that the U.S. Geological Survey marked the Project site as a karst hazard zone. Tr. 1499:17–19 (Staheli). And she explained that it is not recommended to build in a karst hazard zone because there are holes in the ground that could compromise the foundation of buildings. Tr. 1499:21–24 (Staheli). She later testified that she learned this area was known for karstic conditions based on internet research. Tr. 1843:22–1844:1 (Staheli).

d. It was difficult to follow the significance of the U.S. Geological Survey marking the Project site as a karst hazard zone and Dr. Staheli's internet research. Dr. Staheli did not explain what the U.S. Geological Survey is or how it designates a particular area as a so-called karst hazard zone. For example, this

designation could be based on geological features or a subsurface investigation (such as borings). Nor did she explain whether karstic conditions would likely be encountered at specific depths in the formation. Dr. Staheli's testimony is also difficult to square with the dozens of borings and historical reports in the Baseline Report and Data Report that Mr. Hirner testified did not show any evidence of karstic conditions at the Project site.

e. Dr. Staheli contested whether these boring records indicated karstic conditions. Tr. 1511:1–12 (Staheli). She claimed to have seen "evidence of massive losses of drilling fluid when they would be drilling and the hole was stable, and then they would lose massive amounts of fluid into the formation. That can happen in very, very open graded gravel, but it also can be a void." Tr. 1511:4–8 (Staheli). Mr. Hirner countered that this loss of drilling fluid is normal in sandstone when the head pressure is higher than the groundwater pressure. Tr. 851:7–24 (Hirner). Therefore, he opined that the loss of drilling fluid was not evidence of karstic conditions. Tr. 851:7–24 (Hirner). Neither Mr. Hirner nor Dr. Staheli provided much more detail on this issue. Without more robust evidence from either side, I found Mr. Hirner's testimony more credible and am persuaded that whatever loss of drilling fluid Dr. Staheli observed in the boring logs is not evidence of karstic conditions.

f. Dr. Staheli also testified that Bradshaw encountered voids because it lost lubricant and slurry. *See, e.g.*, Tr. 1497:22–23 (Staheli) ("They saw their slurry lost to the ground."). She testified that bentonite lubricant would not get pushed

into the formation and therefore must have disappeared into voids. Tr. 1503:18–25, 1843:13–1844:23 (Staheli). Dr. Staheli opined that although slurry loss can be pumped into the formation depending on the pressure, the loss of slurry is rare. Tr. 1501:21–25 (Staheli).

g. Mr. Hirner responded that bentonite lubrication could be lost into the subsurface. Tr. 841:6–13 (Hirner). And Dr. McGinn opined that much of this lost lubrication was explained by the voids created by Bradshaw's methods of excavation (disturbed St. Peter Sandstone eroding and collapsing). Tr. 1824:17–1825:5 (McGinn).

h. Dr. Staheli's testimony on this issue was not persuasive. Her opinions at times lacked adequate explanations or details. For example, she described the loss of drilling fluid during borings as "massive" and briefly mentioned that the U.S. Geological Survey marked the site as a karst hazard zone without more detail. Dr. Staheli likewise briefly suggested that ECI encountered karstic conditions by referencing that ECI did not return a hundred percent of the material, again, without more context. *See* Tr. 1506:5–12 (Staheli). Finally, Dr. Staheli did not explain at a geological level what type of void Bradshaw encountered or why it makes geological sense to encounter voids in St. Peter Sandstone. When Dr. Heuer submitted a report in support of Bradshaw's differing-subsurface-conditions claim he discussed three possible geological features that Bradshaw could have encountered. P-298 at 6–7 (discussing a conventional fault/fracture zone, a sandstone karst feature, and the Saint Anthony Falls migration mechanism). As I

understood her testimony, Dr. Staheli made no attempt to identify the specific geologic feature that Bradshaw encountered, instead just opining the lost fluid and cuttings *must* have gone into some type of void. *Cf.* Tr. 1844:9–13 (Staheli) ("I don't know where [the bentonite] went. . . . [I]t had to go somewhere.").

Impact of Grouting

300. Dr. Staheli opined that ECI grouted Bradshaw's machine in based on the correlation between the grouting events and Bradshaw's subsequently high jacking forces. Tr. 1514:12–18 (Staheli). Dr. Staheli created a demonstrative exhibit to show this increase in jacking forces. Tr. 1481:21–1482:22 (Staheli). She in part based her opinions on the higher strength of the second grout mix. Dr. Staheli based her conclusion that the second grout mix was stronger on D-183, Mr. Street's email. Tr. 1482:23–1484:2, 1484:13–16 (Staheli).

301. Dr. Staheli testified that after the second grouting event, there was an increase in jacking pressure by 1.0 tons per square foot. Tr. 1840:3–4 (Staheli). She opined that "[y]ou can't generate that from the soil falling in the annulus. You just can't. There's a maximum friction angle, there is sliding friction at the interface, and you just can't 1.0 tons per square foot. The only difference between the second portion of the graph, the middle section, and the third section is they grouted." Tr. 1840:4–10 (Staheli).

302. Dr. McGinn disagreed. Tr. 1796:6–9 (McGinn). According to Dr. McGinn, the primary cause of the increased jacking forces was the frictional forces of the sand. Tr. 1796:10–12 (McGinn). He observed a decrease in jacking forces as the adhesive bond

between any cementitious-based grout in the annular space based on the negative slopes after the drive resumed in December 2019. Tr. 1796:12–16 (McGinn).

303. Based on his review of the production records, Mr. Hirner likewise concluded that the adhesive bond between the MTBM and the grout was broken based on an observable decrease in jacking forces. Tr. 800:3–12 (Hirner).

304. I do not find that Bradshaw's machine was grouted in. At most I find that ECI's grout had a quite insubstantial causal impact on Bradshaw's high jacking forces.

a. Dr. Staheli's opinion was based on the correlation. Her graph showed higher jacking forces after ECI's grouting to remediate the December 3 flood event. Tr. 1513:11–14 (Staheli). But correlation does not imply causation. Tr. 1513:18–19 (Staheli). And Dr. Staheli's graph plotted distance on the *x* axis and jacking forces on the *y* axis. Tr. 1795:10–25 (McGinn). Dr. McGinn testified that this time is significant because the machine becomes sand packed over time, increasing the frictional forces required to push the pipe. Tr. 1795:10–25 (McGinn). In other words, time is a confounding, causal variable that Dr. Staheli didn't account for.

b. I also found it significant that Bradshaw never suggested the machine was grouted in before it was terminated. Bradshaw has considerable microtunneling experience. And Bradshaw knew grouting occurred near the annulus because ECI needed to stop a leak in the tunnel eye seal. Bradshaw's explanation why it didn't raise the issue was that it didn't know how strong the grout was. But I've already found this that the grout was the same consistency both times, that Bradshaw was aware of the grout's consistency, and that Bradshaw selected the grout composition.

c. During her rebuttal testimony, Dr. Staheli opined about the importance of the water-cement ratio of grout. Tr. 1834:12–1835:7 (Staheli). But she had not discussed this in her written rebuttal report or deposition. Tr. 1854:9–13, 1855:23 (Staheli).

d. It makes sense that grout filling the annulus could contribute to high jacking forces by narrowing the annulus. But it was less clear how grout could cause jacking forces to steadily increase after the adhesion bond between the grout and the casing pipe was broken. After all, the grout would only narrow the section of the annulus where it was placed. Conversely, pushing sand into the annulus, packing sand around the machine, and sand locking around the casing over time, better explains the steady increase in jacking forces.

e. This conclusion is also based on more general credibility grounds. Some of these reasons have been previously discussed. Dr. McGinn's testimony was clear, measured, and direct. The same was true for Mr. Hirner. Dr. Staheli's testimony was harder to follow. She often did not respond to questions posed. *See, e.g.*, Tr. 1863:10–1864:8 (Staheli). Several answers jumped between different issues. *See, e.g.*, Tr. 1842:20–1844:1 (Staheli). I find Mr. Hirner and Dr. McGinn more credible than Dr. Staheli on this issue.

Bradshaw's Requests for Payment

305. On November 20, 2019, Bradshaw submitted Payment Application 598-1, its first payment application on the Project. D-517. The schedule of values for this payment application contains entries for two items: (1) Installation of 60″ Steel Casing via

Microtunneling; and (2) Performance & Payment Bond. D-517 at 2; Tr. 308:25–310:24 (Johnson). The amount sought by this payment application was $972,124.07, which consisted of $1,023,288.49 less 5% retainage of $51,164.42. D-517 at 1; Tr. 309:18–310:5 (Johnson).

306. The largest part of this payment application was associated with invoices from Bradshaw's Permalok pipe supplier, totaling $921,949.51. D-517 at 4, 6 (adding total amounts from invoice number 9000115880 and invoice number 9000115922). The total amount for the pipe, less 5% retainage, was $875,852.03 ($921,949.51 – $46.097.48[15] = $875,852.03).

307. Bradshaw's Payment Application 598-1 also included amounts for the installation of forty feet of tunneling work that Bradshaw performed prior to November 20, 2019. D-517 at 2; Tr. 1157:18–1158:1 (Eisold). It also sought $26,252.80 for the payment of Bradshaw's premium for its performance and payment bond. D-517 at 2; Tr. 1157:18–22 (Eisold).

308. On December 3, ECI submitted Application for Payment #8, requesting a $1,060,679.75 payment from the City for the pay period ending November 30, 2019. J-15 at 1. In the schedule of values for this payment application, under the item 60″ Microtunneling, ECI listed $921,405.00 for work completed through November 20, 2019. J-15 at 2.

[15] $921,949.51 * .05.

309. The sole payment Bradshaw received for its work on the Project was a check for $846,194.40 issued by ECI on January 30, 2020. P-149. This check was solely for the Permalok pipe. P-149 at 3.

310. ECI has been paid in full on all its Payment Applications—less retainage from the City. Tr. 310:19–24 (Johnson).

ECI's Damages

311. ECI tracked its costs by opening a separate job cost code within its accounting system starting in November 2019 to identify any costs it attributed to the corrective work and Bradshaw's failure to perform. This included personnel and payroll costs, materials, equipment, and subcontractors. Tr. 209:2–16 (Johnson).

312. On the payroll side, each of ECI's foremen and superintendents tracked time, including straight/regular time and overtime, that could be cost coded and entered into the accounting system. Tr. 209:21–210:5 (Johnson). Materials, vendor receipts, and subcontractor receipts were coded under a project number and maintained in ECI's accounting system. Tr. 210:6–13 (Johnson).

313. These costs were recorded contemporaneously with reviewing the invoices and other costs incurred on the Project. Tr. 211:6–9 (Johnson).

314. All costs tracked by ECI that it believed were related to Bradshaw's breach were exported from ECI's accounting system as a job cost report. P-147; Tr. 210:18–211:5 (Johnson).

315. ECI retained Mark Gentry, a professional engineer and partner at HKA, to analyze the delays that occurred on the Project, as well as the damages sustained by ECI

because of Bradshaw's breach of contract and other counts pled in ECI's Complaint. HKA is a business and litigation consulting firm. Mr. Gentry's practice is centered on helping contractors, owners, subcontractors and engineers through business disputes related to construction projects. Tr. 942:23–943:3, 945:22–23, 948:23–949:1 (Gentry).

316. In forming his opinions regarding Project delays and ECI's damages, Mr. Gentry reviewed and relied on the Subcontract between ECI and Bradshaw, the Prime Contract between the City and ECI, project schedules (including planned schedules and how the work progressed), project meeting minutes, and correspondence. He also spoke with ECI employees, conducted a site visit, reviewed deposition transcripts, and had access to Relativity, a database of documents produced by the parties in discovery. Tr. 949:8–950:9 (Gentry).

317. Mr. Gentry opined that Bradshaw caused 392 days of delay on the Project and $7,215,585 in damages through its failure to complete its microtunneling drive and its breach of the Subcontract, as summarized in the chart below.

Damages Description	**Amount**
Additional ECI Pre-Termination Costs	$250,691
Additional ECI Microtunneling=Related Costs	$2,936,678
Extended General Conditions	$1,246,168
Overhead and Profit	$734,637
City of Minneapolis Damages (LDs and additional invoices)	$2,047,411
Total Damages	$7,215,585

Tr. 950:20–952:13 (Gentry).

Gentry's Assignment of Delay

318. Project delays were analyzed to assist in the analysis of economic damages. The Prime Contract included a required completion date and provided for liquidated

damages for a late completion. In addition, the longer ECI is on the Project compared to as planned, the more costs it will incur. Tr. 952:22–953:5 (Gentry).

319. In performing the analysis, Mr. Gentry used an as-planned versus as-built critical path method of schedule analysis where he divided the project into a number of smaller periods to help guide and summarize the analysis. The as-planned schedule was the agreed-to plan between ECI, the owner, and the owner's engineer and was compared to what actually occurred on the Project. As-planned dates were identified from the project schedules and submittals, and as-built dates were identified through ECI's schedule that recorded activities and as-built information. Other contemporaneous records were used to validate when activities occurred and what activities were occurring on the Project. Tr. 953:15–20, 954:8–955:3 (Gentry).

320. The critical path on a construction project is the chain of activities or sequence of interconnected activities and logical relationships which define when a project can complete. Tr. 953:21–24 (Gentry).

321. Mr. Gentry subdivided the delay analysis into three periods: (1) Period 1: Project commencement through November 6, 2019 (the day before Bradshaw started microtunneling); (2) Period 2: November 7, 2019, through May 19, 2019 (the day Bradshaw commenced through the day the microtunneling machine was gutted); and (3) Period 3: Water main installation through substantial completion. Tr. 955:6–19 (Gentry).

322. Mr. Gentry identified 563 days of delay on the Project. Tr. 956:7–9 (Gentry).

323. Of the 563 days of delay on the Project, there were 28 days of delay during Period 1, all of which Mr. Gentry conceded were ECI's responsibility. There were 488

days of delay during Period 2: 392 of which Mr. Gentry attributed to Bradshaw and 96 of which Mr. Gentry attributed to Keller (a ground-freeze subcontractor). Finally, there were 61 days of delay during Period 3, all of which Mr. Gentry acknowledges were ECI's responsibility. Mr. Gentry assigned responsibility for delay based on the various records that were reviewed as well as his understanding of contractual responsibility. Tr. 956:16–957:19 (Gentry).

324. Contractor float refers to the number of days between the as-planned completion date and the required completion date. On this Project, ECI planned to complete the water main installation by March 17, 2020, and the required completion date was March 31, 2020. Tr. 957:20–958:3 (Gentry).

325. During Period 1, pre-tunneling, Mr. Gentry determined that microtunneling was supposed to commence on October 10, 2019, but the predecessor work for microtunneling was not completed until November 6, 2019, resulting in a twenty-eight-day delay. All twenty-eight days of delay were ECI's responsibility. Tr. 958:4–20 (Gentry).

326. Period 2 on a high-level included the microtunneling operations phase of the Project, or when microtunneling was attempted and completed. There were 488 calendar days of delay associated with Period 2, including flood events, Bradshaw's termination, and required modifications to the site to permit completion of the microtunneling operation. Tr. 959:1–13 (Gentry).

327. Mr. Gentry subdivided Period 2 into five subcategories to help summarize the analysis. Tr. 959:14–22 (Gentry).

328. Period 2 was subdivided into the following categories: (1) Period 2.1 was the period when Bradshaw performed some of its microtunneling activities, from November 7, 2019, through its termination on February 26, 2020. (2) Period 2.2 was the period when ECI was working to develop a new plan to complete the microtunneling work without Bradshaw, including contacting other subcontractors and vendors, getting approval for the revised plan, making modifications to the working and retrieval shafts, and doing other similar activities. (3) Period 2.3 was the period when ECI and Akkerman microtunneled under the Mississippi River through exposing the cutterhead in the retrieval shaft thimble. (4) Period 2.4 included the retrieval of certain parts and pieces of the Akkerman MTBM and contact grouting. (5) Period 2.5 was associated with the January 20, 2021 flood event and included remediation and the final gutting of the MTBM. Tr. 959:23–961:3 (Gentry).

329. Mr. Gentry identified the following delays during each subperiod:

- Period 2.1: 112 days of Bradshaw-responsible delay;
- Period 2.2: 156 days of Bradshaw-responsible delay;
- Period 2.3: 13 days of Bradshaw-responsible mitigation, which offset Bradshaw-responsible delay;
- Period 2.4: 137 days of Bradshaw-responsible delay; and
- Period 2.5: 96 days of Keller-responsible delay.

Tr. 961:4–22 (Gentry).

330. During Period 2.1, Bradshaw commenced microtunneling on November 7, 2019. Bradshaw was ultimately terminated on February 26, 2020. Mr. Gentry attributed

all 112 days in this period to Bradshaw because Bradshaw's microtunneling was abandoned and not completed. Tr. 962:15–964:14 (Gentry).

331. Period 2.2 was the period when ECI was preparing to restart microtunneling operations. Period 2.2 runs from February 27, 2020, through July 31, 2020. During this period, ECI was contacting subcontractors and vendors to identify other machines and vendors to complete the microtunneling work. ECI also worked with the City to get approval of a new plan and ultimately had to make modifications to the launch and retrieval shafts. There were 156 days of delay during period 2.2, all of which Mr. Gentry attributed to remediating Bradshaw's failure to perform. Because ECI had already gone through the process of getting ready to start microtunneling, Mr. Gentry opined that this work did not advance the critical path of the Project. Tr. 964:17–967:10 (Gentry).

332. Period 2.3 ran from August 1, 2020, through August 13, 2020, and was the period where the ECI and Akkerman team completed the microtunneling work. ECI and Akkerman completed this work in 13 days as compared to 26 days that were planned. Mr. Gentry assigned these 13 days of mitigation to Bradshaw because it was Bradshaw's responsibility to complete the tunneling work. Tr. 967:15–968:13 (Gentry).

333. Period 2.4 runs from August 14, 2020, through January 20, 2021. It includes the 160-day period where the MTBM reached the retrieval shaft, and the project team was trying to retrieve the machine so that the next phase of activities could proceed. Mr. Gentry selected January 20, 2021, as the end date for Period 2.4. ECI claims this flood event was caused by Keller. Of the 160 days in Period 2.4, 23 days of planned critical path work were completed by ECI and Akkerman, including some contact grouting and

demobilization activities. The other 137 days were delays Mr. Gentry attributed to Bradshaw. Tr. 968:14–973:24 (Gentry).

334. Period 2.5 ran from the January 21, 2021 flood through May 19, 2021, when ECI and Akkerman finished gutting the Akkerman MTBM. Mr. Gentry assigned the 96 days of delay in Period 2.5 to Keller. Tr. 974:3–12 (Gentry).

ECI's Direct Costs and Expenses

335. In addition to analyzing Project delays and identifying the entity that caused those delays, Gentry also provided expert opinions regarding ECI's direct damages, including the additional costs and expenses incurred by ECI in completing Bradshaw's microtunneling scope of work, costs and expenses related to the fact that it was on the Project site longer than originally planned, and lost profits and overhead. Tr. 975:1–18 (Gentry).

336. In calculating ECI's direct damages caused by Bradshaw's failure to complete its microtunneling work, Mr. Gentry reviewed the job cost reports for the job codes opened by ECI to record its additional costs on the Project. Tr. 975:19–976:11 (Gentry).

337. Based on his review of these records, Mr. Gentry opined that ECI incurred an additional $250,691 in costs prior to Bradshaw's termination. These costs included work related to the flooding events and shaft seal replacement. Tr. 977:19–978:25 (Gentry).

338. Mr. Gentry also quantified the additional costs and expenses incurred by ECI in performing the microtunneling. These additional costs and expenses were calculated

through an "actual less should-have been" or but-for analysis. The "should-have-been" cost was $2,651,533, which is the amount that ECI would have paid Bradshaw to complete the microtunneling under the Subcontract if it had not been terminated for cause. Instead, ECI and Akkerman completed the microtunneling work. Mr. Gentry opined that ECI incurred $4,742,017 in costs associated with that work, in addition to what ECI paid Bradshaw for Permalok pipe delivered to the site. Mr. Gentry calculated ECI's damages under this analysis at $2,936,678. Tr. 980:12–981:11.

339. Mr. Gentry calculated the $4,742,017 in actual microtunneling-related costs in the same way that the pre-termination costs were calculated. The largest component in ECI's actual microtunneling-related costs was $1,598,469 in equipment costs, 95% of which were Akkerman-related charges. The Akkerman charges run primarily from April 2020 through September 2020. In addition to the equipment-related charges during this period, ECI incurred $1,363,423 in additional labor costs for completing Bradshaw's microtunneling scope of work. Mr. Gentry verified the labor costs through a review of contemporaneous records. ECI also incurred $522,726 in additional costs for materials used to complete Bradshaw's microtunneling scope of work and an additional $1,257,399 in subcontractor costs to complete Bradshaw's microtunneling. As with the other costs analyzed by Mr. Gentry and HKA, contemporaneous records such as invoices, daily reports, meeting minutes, and correspondence were reviewed to confirm that these additional costs were related to microtunneling. ECI's total additional costs for completing the microtunneling scope of work was $5,588,211. Tr. 981:12–987:8 (Gentry).

340. From the $5,588,211 in actual total microtunneling costs, Mr. Gentry subtracted out the $2,651,533 value of ECI and Bradshaw's Subcontract, as well as amounts paid to Bradshaw for Permalok pipe, for a total of $2,936,678 in microtunneling costs. Tr. 980:12–981:11, 987:9–14 (Gentry).

341. ECI also incurred extended general conditions. Extended general conditions are cost elements incurred for being at a project site longer than planned, such as costs for overseeing and performing the construction work, including (superintendents and project managers), equipment costs, and other time-related costs for being on site longer than planned. Mr. Gentry calculated an average daily rate of $3,179 and multiplied this by the 392 days of delay he attributed to Bradshaw to come up with the $1,246,168 in extended general condition damages. Tr. 987:15–989:6 (Gentry).

342. Mr. Gentry also accounted for overhead and lost profits in his damages calculations. He first compared ECI's agreed to price with the City of $15,599,725 to ECI's budgeted cost of $13,382,245 to determine that there was a markup of 16.57% in the contract price to account for overhead and lost profits, or $734,637 for the Project. Tr. 989:7–990:4 (Gentry).

343. Finally, ECI contends that a portion of the damages assessed against ECI by the City was caused by Bradshaw's delays. Because the City assessed liquidated damages against ECI based on a rate of $5,000 per day, Mr. Gentry multiplied his attributed number of delay-related days (392) by $5,000 to reach $1,960,000. Tr. 974:16–25, 990:21–991:12 (Gentry). Mr. Gentry also opined that Bradshaw is responsible for the two American Engineering Technology invoices totaling $87,411. Tr. 991:8–12 (Gentry).

Bradshaw's Damages Expert

344. Bradshaw called Joseph Egan as a damages expert to offer rebuttal testimony regarding ECI's entitlement to these claimed damages. Tr. 1603:17–23 (Egan).

345. Mr. Egan opined that allowing ECI to recover field overhead costs and markup for profit and overhead would essentially be paying ECI twice for the same damages. Tr. 1606:10–13 (Egan).

346. Mr. Egan testified that Mr. Gentry's assessment of profit and overhead also contradicts industry methodology for damages. By adding profit and overhead, Mr. Egan claimed that Gentry's analysis makes ECI more than whole. Tr. 1607:2–21 (Egan).

347. Mr. Egan provided alternative calculations that removed 137 days of delay between August 14, 2020, and January 20, 2021, during which time ECI and Akkerman were unable to retrieve the MTBM. Tr. 1616:3–1617:12 (Egan).

348. By removing those 137 days, ECI's additional microtunneling costs decrease, as do ECI's extended general condition costs. Tr. 1617:13–17.

349. Mr. Egan also criticized Mr. Gentry's calculation of material costs associated with ECI's claim for additional microtunneling costs. Akkerman provided a credit of $614,000. Mr. Gentry assigned the credit by working backwards based on the last-in, first-out method. Mr. Gentry's method resulted in a $380,000 credit to Bradshaw. Mr. Egan argued that the credit should be applied equally to all invoices—this would result in a $561,000 credit to Bradshaw. Tr. 1613:19–1615:16 (Egan).

350. Finally, Mr. Egan argued that Mr. Gentry's calculation failed to consider ECI's additional revenue from the City. Tr. 1611:8–1613:18 (Egan) (describing Gentry's calculations as resulting in a windfall).

CONCLUSIONS OF LAW

1. Bradshaw requests an adverse inference based on ECI's failure to call Mr. Street. This request is unsupported and will be denied. "[A]n unfavorable inference may arise against him for failure to produce a particular witness." *Connolly v. Nicollet Hotel*, 104 N.W.2d 721, 731 (Minn. 1960); *see also Johnson v. Richardson*, 701 F.2d 753, 757 (8th Cir. 1983) (finding that it was not error to permit an attorney to comment upon the absence of a key witnesses during trial). Courts are generally cautious about adverse inferences because they are based on speculation about what an absent witness would have testified to rather than direct evidence. *See Medtronic, Inc. v. Edwards Lifesciences*, No. 11-cv-1650 (JNE/JSM), 2014 WL 12610209, at *10 (D. Minn. Apr. 17, 2014). No negative inferences will be drawn based on Mr. Street's absence. Bradshaw could have also called Street. And because Bradshaw raised this issue for the first time in its proposed findings, ECI never had a chance to explain why he wasn't called.

2. The default rule for standard of proof in civil claims is the preponderance-of-the-evidence standard. *TIG Ins. Co. v. Missionary Oblates of Mary Immaculate*, No. 20-cv-2261 (ECT/JFD), 2023 WL 7001760, at *15 (D. Minn. Oct. 24, 2023); *see also Vermillion State Bank v. Tennis Sanitation, LLC*, 969 N.W.2d 610, 626 (Minn. 2022). Although exceptions exist, both parties agree that none apply here. "'Preponderance of the evidence' means the greater weight of evidence." *Smith v. United States*, 726 F.2d 428,

430 (8th Cir. 1984). "If, upon any issue in the case, the evidence appears to be equally balanced, or if it cannot be said upon which side it weighs heavier, then [the party with the burden of proof on that issue] has not met his or her burden of proof." *Id.*

ECI's Breach of Contract Claim

3. To prevail on its breach-of-contract claim against Bradshaw, ECI must establish that (1) ECI and Bradshaw formed a contract; (2) ECI performed any conditions precedent to its right to demand Bradshaw's performance under the contract; and (3) Bradshaw breached the contract. *Park Nicollet Clinic v. Hamann,* 808 N.W.2d 828, 833 (Minn. 2011). ECI must also establish damages caused by Bradshaw's contractual breach. *See Nelson v. Am. Fam. Ins. Co.,* 899 F.3d 475, 480 (8th Cir. 2018) (applying Minnesota law).

4. The Subcontract is a valid contract. *See* J-7. And there was no unsatisfied condition precedent for Bradshaw to start performing; it began microtunneling on November 7, 2019. The fighting issue is whether Bradshaw breached the Subcontract.

Bradshaw Materially Breached the Subcontract

5. Paragraph 9 of the Subcontract states that Bradshaw "shall be in material breach if, after five (5) days' written notice, Subcontractor . . . *(e)* unreasonably fails to complete or proceed with Work per schedule; [or] *(f)* tells Contractor that it will not perform." J-7 ¶ 9.

6. On January 21, 2020, ECI sent Bradshaw a written notice of deficiency in accordance with paragraph 9 of the Subcontract. *See* P-667.

7. And there is no question that Bradshaw failed to proceed with its work per the schedule. The Subcontract set an estimated start date of September 2, 2019, and set an estimated substantial completion date of November 22, 2019. J-7 at 1. That's about eighty days for Bradshaw to substantially complete its work. Bradshaw arrived at the Project site on September 30, and ECI turned over the shaft to Bradshaw on October 30. D-454 at 1, 22. Microtunneling commenced November 7. Tr. 84:22–23 (Johnson). As of February 26, 2020, the date on which Bradshaw was ultimately terminated and 111 days after it commenced tunneling, Bradshaw's work remained only eight percent complete. Tr. 207:21–208:1 (Johnson); Tr. 1708:3–9 (Lester).

8. And time was of the essence. *See* J-4 § 18.09; *see also* Tr. 870:15–873:9 (Pfister). When time is of the essence, failure to perform within the given schedule is ordinarily a material breach. *See Aadland v. Ranweiler,* No. A-17-1234, 2018 WL 1902457, at *5 (Minn. Ct. App. Apr. 23, 2018).

9. However, under the plain language of paragraph 9, just being behind schedule is not enough. Rather, a failure to complete or proceed on schedule is only a material breach when that failure is unreasonable. Including this reasonableness term implies that a determination of breach under this paragraph is a fact-based inquiry; one that requires considering why Bradshaw was behind schedule and whether its delays were reasonable. *Cf.* 7 Bruner & O'Connor Construction Law § 18:24 (Nov. 2024 Update) ("Evaluation of the adequacy and materiality of the contractor's progress as a basis for termination requires careful consideration [of eleven factors].").

10. Bradshaw contended at trial that its work on the Project was compromised at every turn by ECI. I was not persuaded. I did not find that ECI's grouting to remediate the November 7 leak damaged Bradshaw's tunnel eye seal. Nor did I find that ECI's grouting to remediate the December 3 leak grouted in Bradshaw's MTBM. I likewise rejected Bradshaw's claim that karstic conditions prevented Bradshaw from completing the tunnel. And although the flood events delayed Bradshaw's work, it did not stop Bradshaw from microtunneling after the leaks were fixed.

11. Instead, I found that Bradshaw's use of water-only slurry, failure to pressurize the annulus with bentonite, and failure to control the erosional capacity of St. Peter Sandstone were the main causes of Bradshaw's high jacking forces (and in turn why it could not complete the microtunneling drive). Having concluded that Bradshaw's means and methods were the main cause of its substantial delays (not ECI or unanticipated subsurface conditions), I find that Bradshaw's failure to proceed with its work according to the schedule was unreasonable.

12. It also makes sense to read this reasonableness term in conjunction with the change-order and differing-subsurface-conditions provisions. Contractual change-order procedure is designed to play a vital role in addressing project delays. *Cf. In re Cent. States Mech.*, No. 11-1129-JTM, 2012 WL 3896940, at *10 (D. Kan. Sept. 7, 2012). Section 5.04 of the Supplementary Conditions, which requires contractors to promptly report differing subsurface conditions, serves the same purpose. Although not dispositive, Bradshaw's failure to successfully avail itself of these express rights under the Subcontract for extensions supports the unreasonableness of Bradshaw's substantial delays. *Cf. United*

States ex rel. Quality Tr., Inc. v. Cajun Contractors, Inc., 486 F. Supp. 2d 1255, 1269 (D. Kan. 2007); *Boldt Co. v. Black & Veatch Constr., Inc.*, No. 19-cv-08383, 2023 WL 2711562, at *14 (N.D. Ill. Mar. 30, 2023), *reconsideration denied*, 2023 WL 6392406 (N.D. Ill. Oct. 2, 2023).

13. I also find that Bradshaw told ECI it would not perform. Bradshaw stopped work on January 4, 2020, after it ran out of ideas on how to advance its MTBM. And it repeatedly told ECI and the City that the ground was not microtunnelable and that attempts to complete the microtunnel would end in failure. P-712; P-29; Tr. 127:1–20, 139:12–141:16, 141:19–142:20, 177:22–178:19 (Johnson); Tr. 361:7–24, 366:13–25 (Umlauf); Tr. 471:7–22 (Marshall); Tr. 560:25–561:25, 569:1–25 (Anderson); Tr. 659:21–660:8, 661:20–662:1 (Markos); 884:10–885:2 (Pfister).

14. Although ECI submitted a tunnel action plan after this notice of default, I found that this tunnel action plan was not a serious attempt to complete the microtunnel.

Prior Breach Doctrine

15. Bradshaw contends that its material breach is excused under the prior breach doctrine. Under Minnesota law, the "prior breach doctrine" holds that a party that first materially breaches a contract is typically precluded from claiming any amounts against the other party for that party's subsequent breach. *Carlson Real Est. Co. v. Soltan*, 549 N.W.2d 376, 379 (Minn. Ct. App. 1996) ("Under general contract law, a party who first breaches a contract is usually precluded from successfully claiming against the other party."); *see also MTS Co. v. Taiga Corp.*, 365 N.W.2d 321, 327 (Minn. Ct. App. 1985) ("A rule in the law of contracts is that a party cannot raise to its advantage a breach of

contract against another party when it has first breached the contract itself."); *Info-Bahn, Inc. v. Brown*, No. C1-00-1758, 2001 WL 506810, at *3 (Minn. Ct. App. May 15, 2001) ("It is undisputed that when a party to a contract breaches first, that initial breach constitutes legal justification for the other party's subsequent failure to perform."). Otherwise stated, "[t]he first breach serves as a defense against the subsequent breach." *Carlson*, 549 N.W.2d at 380.

16. To excuse a subsequent breach, the first party's breach must be material. *TC/Am. Monorail, Inc. v. Custom Conveyor Corp.*, 822 N.W.2d 812, 817 (Minn. Ct. App. 2012) (stating that "the better expression of [the prior breach doctrine] is that a breach must be material in order to excuse performance"), *rev'd on other grounds,* 840 N.W.2d 414 (Minn. 2013); *see also Nutrisoya Foods, Inc. v. Sunrich LLC*, 626 F. Supp. 2d 985, 992 (D. Minn. 2009) ("Under the prior breach doctrine, the breach by the first party must be material and uncured to excuse the second party from performance."). The Minnesota Court of Appeals has defined a material breach as follows:

> A material breach is "[a] breach of contract that is significant enough to permit the aggrieved party to elect to treat the breach as total (rather than partial), thus excusing that party from further performance and affording it the right to sue for damages." *Black's Law Dictionary* 214 (9th ed. 2009). A material breach "goes to the root or essence of the contract." 15 Samuel Williston & Richard A. Lord, A Treatise on the Law of Contracts § 44:55 (4th ed. 2000). The supreme court has held that even when express conditions of the contract are violated, the breach is not necessarily material. *See Boatwright Constr., Inc. v. Kemrich Knolls,* 306 Minn. 519, 520–21, 238 N.W.2d 606, 607 (1976) (holding that although seller of tract of land made express contractual agreement to oil streets by a specific date, seller's failure to oil such streets was not a material breach).

BOB Acres, LLC v. Schumacher Farms, LLC, 797 N.W.2d 723, 728–29 (Minn. Ct. App. 2011) (alteration in original).

17. According to the inclusions and exclusions attached to the Subcontract, ECI was contractually responsible for building the launch shaft, headwall, and thrust block. J-7 at 9. These exclusions and inclusions were never modified through a written change order, work change directive, or field order. Bradshaw's theory is that ECI's defective construction of the launch shaft was a material breach of contract that excuses its subsequent failure to complete the microtunnel.

18. This argument will be rejected for several reasons. First is the site deficiency clause in the Subcontract, which reads:

> If any part of the Subcontract Work depends on another's work at the Project Site, [Bradshaw] shall inspect and promptly report to [ECI] delays, deficiencies or apparent defects in the other's work or jobsite conditions, and may request a Change. [Bradshaw's] failure to inspect and promptly report objections to another's work shall constitute acceptance of that work as fit and proper.

J-7 ¶ 4(i).

19. "[T]he primary goal of contract interpretation is to determine and enforce the intent of the parties." *Motorsports Racing Plus, Inc. v. Arctic Cat Sales, Inc.*, 666 N.W.2d 320, 323 (Minn. 2003). Interpretation of unambiguous contracts is a question of law for the court, as is the determination that a contract is ambiguous. *Denelsbeck v. Wells Fargo & Co.*, 666 N.W.2d 339, 346 (Minn. 2003). "If the court determines that the contract language is unambiguous—meaning it has only one reasonable interpretation—it will give

effect to that language" and determine the parties' intent "from the language of the written contract alone." *Minn. Vikings Football Stadium, LLC v. Wells Fargo Bank, Nat'l Ass'n*, 193 F. Supp. 3d 1002, 1011 (D. Minn. 2016) (quoting *Winthrop Res. Corp. v. Sabert Corp.*, 567 F. Supp. 2d 1084, 1091 (D. Minn. 2008)).

20. Bradshaw does not dispute that its microtunneling work depended on the construction of the launch shaft. And "[i]t is a well-worn maxim that use of the term 'shall' reflects a mandatory imposition." *Travertine Corp. v. Lexington-Silverwood*, 683 N.W.2d 267, 272 (Minn. 2004). Therefore, paragraph 4(i) required Bradshaw to inspect the launch shaft and report to ECI any deficiencies or apparent defects in ECI's work. Bradshaw never reported any defects in the launch shaft. This failure to promptly report objections "shall constitute acceptance of that work as fit and proper." J-7 ¶ 4(i).

21. "Acceptance of work" is a phrase that must be interpreted in the construction-law context. As the Minnesota Court of Appeals explained, "acceptance by the owner operates as a waiver of any readily ascertainable defects in the construction." *Spartan Mech., Inc. v. St. Paul Fire & Marine Ins. Co.*, 414 N.W.2d 476, 479 (Minn. Ct. App. 1987); *see also* 5 Bruner & O'Connor Construction Law § 13:53 (Nov. 2024 Update) ("Traditionally, the act of final acceptance of the work has carried with it significant risk allocation ramifications."). However, acceptance ordinarily does not operate as waiver of latent defects. *Cf. Spartan Mech.*, 414 N.W.2d at 479; 5 Bruner & O'Connor Construction Law § 13:61 (Nov. 2024 Update) (discussing latent defects in the context of federal contracting). Interpreting the site-deficiency clause within this context, Bradshaw is barred

from asserting that ECI materially breached the contract by defectively constructing the launch shaft so long as the alleged defects were patent.

22. On this trial record, the better answer is that relevant defects in the construction of the launch shaft were patent. As Mr. Eisold and Dr. Staheli testified, the headwall should have been poured against a completed shotcrete shaft wall. Tr. 1080:23–1081:6 (Eisold); Tr. 1471:21–23 (Staheli) ("[T]he shaft wall is incorporated into the shaft, whereas the headwall is the concrete component that is formed inside the shaft at the launch."). That the launch-shaft wall was incomplete—and that the headwall was not being built against a completed shaft wall—was obvious when Bradshaw personnel entered the shaft. *See* P-732. Mr. Britton and Mr. Short both observed the state of the tunnel entry point and could tell that something wasn't right. *See* Tr. 1259:15–21 (Britton); Tr. 1456:1–8 (Short). Although the omission of the portal steel was slightly less obvious, it could have been ascertained with minimal investigation. *See* Tr. 1176:14–1177:21 (Eisold); Tr. 1519:5–1525:13 (Staheli). And any defects in the headwall would have been evident to Bradshaw because it took the lead in building the headwall.[16] Because defects in the launch shaft were patent and Bradshaw failed to object or report the defects, it is barred from claiming that those defects excused its subsequent failure to perform.

23. Whether cutting two lattice girders was patent or latent is a closer call. But in the end, it doesn't matter. Even if cutting two lattice girders was a latent defect and

[16] The omission of the portal steel could have been a latent defect if ECI turned over the shaft to Bradshaw with a completed shotcrete shaft wall. In that case, Bradshaw might have reasonably believed that the portal steel was embedded in the shotcrete wall. That's not what happened.

assuming that this breached the Subcontract, such a breach was not material. I did not find that cutting two lattice girders had any impact on the November 7 flood event or Bradshaw's ability to microtunnel. Simply put, cutting a second lattice girder was not significant.

24. Second, Bradshaw is equitably estopped from claiming defects in the headwall excuse its subsequent breach. "Estoppel is an equitable doctrine addressed to the discretion of the court and is intended to prevent a party from taking unconscionable advantage of his own wrong by asserting his strict legal rights." *N. Petrochemical Co. v. U.S. Fire Ins. Co.*, 277 N.W.2d 408, 410 (Minn. 1979); *see also Kuhlmann v. Educ. Publishers*, 71 N.W.2d 889, 891 (Minn. 1955) (stating that "the doctrine of equitable estoppel is a flexible concept not readily susceptible of any fixed definition"). To prove estoppel, a plaintiff must show that (1) "defendant made representations or inducements, [2] upon which plaintiff reasonably relied, and [3] plaintiff will be harmed if the claim of estoppel is not allowed." *N. Petrochemical Co.*, 277 N.W.2d at 410. Representations or inducements can be conduct. *Drake v. Reile's Transfer & Delivery, Inc.*, 613 N.W.2d 428, 434 (Minn. Ct. App. 2000); *see also Ridgewood Dev. Co. v. State*, 294 N.W.2d 288, 292 (Minn. 1980) ("As a general rule, for equitable estoppel to lie, the plaintiff must demonstrate that the defendant, through his language or conduct, induced the plaintiff to rely, in good faith, on this language or conduct to his injury, detriment or prejudice.").

25. Although ECI was obligated to build the headwall under the Subcontract, Bradshaw offered to take the lead on building it. By offering to build the headwall, Bradshaw was acting inconsistent with its strict rights under the Subcontract. Then

Bradshaw built and installed the forms according to its design with help from ECI. ECI reasonably relied on Bradshaw's offer and work. Bradshaw is experienced at microtunneling, and Mr. Short told ECI that Bradshaw was familiar with building headwalls. Then the launch shaft flooded because of Bradshaw's work. To allow Bradshaw to excuse its subsequent material breach because of its own deficient work would be unconscionable. Moreover, Bradshaw seeks to excuse its subsequent failure to perform despite continuing to perform under contract. *See St. Jude Med. S.C., Inc. v. Tormey*, 779 F.3d 894, 899 (8th Cir. 2015) ("The continued recognition of a contract as still binding after a breach is a waiver of the breach.").

26. Third, to the extent ECI breached the Subcontract, the breach was not material. A material breach goes to the root or essence of the contract. *BOB Acres, LLC*, 797 N.W.2d at 728. The essence of the Subcontract was for ECI to pay Bradshaw to microtunnel. *See* J-7. The Subcontract includes several exclusions which describe contractual responsibilities of ECI (not Bradshaw). Among these are requirements related to the launch shaft. *See* J-7 at 9. Although the flood delayed Bradshaw's work, any defects in the launch shaft were cured and Bradshaw continued its microtunneling. Any breach here in ECI's contractual obligations was partial, not total, and did not relieve Bradshaw from its subsequent contractual obligations.

ECI's Damages

27. "Upon breach, Contractor may finish the Work, replace or re-perform any defective Work; and charge to Subcontract any cost to complete, correct or becomes owed to Owner, plus damages from delay or disruption, plus liquidated or actual damages caused

by Subcontractor's breach." J-7 ¶ 9. The cost of completion is an ordinary method for calculating contract damages. *See Blaine Econ. Dev. Auth. v. Royal Elec. Co.*, 520 N.W.2d 473, 477–79 (Minn. Ct. App. 1994); 7 Bruner & O'Connor Construction Law § 19:78 (Nov. 2024 Update). Costs to complete must be reasonable. *City of Winona v. Jackson*, 100 N.W. 368, 371 (Minn. 1904) ("[T]he measure of [damages incurred due to contractor's default] was the reasonable cost and expense of completing work."); *see also* 7 Bruner & O'Connor Construction Law § 19:78 (Nov. 2024 Update).

28. Cost-to-complete damages are subject to mitigation principles. *See* 7 Bruner & O'Connor Construction Law § 19:78 (Nov. 2024 Update) ("[A claimant] is entitled to recover its cost of contract completion in excess of the contract price so long as the owner acted 'reasonably' in mitigating its losses during completion."). "It is a well-settled principle of contract law that a nonbreaching party is duty-bound to use reasonable diligence to mitigate damages." *Deutz-Allis Credit Corp. v. Jensen*, 458 N.W.2d 163, 166 (Minn. Ct. App. 1990); *see also County of Blue Earth v. Wingen*, 684 N.W.2d 919, 924 (Minn. Ct. App. 2004). "[I]n the case of a breach of contract the burden of proof is upon the defendant to show that damages were or could have been mitigated by reasonable diligence." *Lanesboro Produce & Hatchery Co. v. Forthun*, 16 N.W.2d 326, 381 (Minn. 1944); *see also Goldmount Veterinary Ctr., P.A. v. Watonwan County*, No. A22-0081, 2022 WL 2297387, at *5 (Minn. Ct. App. June 27, 2022) (same). "Reasonableness is a question of fact . . . ." *Goldmount Veterinary Ctr.*, 2022 WL 2297387, at *5.

29. The starting point for calculating damages is Mr. Gentry's calculations. As a reminder, those are:

Damages Description	**Amount**
Additional ECI Pre-Termination Costs	$250,691
Additional ECI Microtunneling Related Costs	$2,936,678
Extended General Conditions	$1,246,168
Overhead and Profit	$734,637
City of Minneapolis Damages (LDs and additional invoices)	$2,047,411
Total Damages	$7,215,585

30. ECI will not be awarded its requested pre-termination costs in the amount of $250,691. These costs included work related to the flooding events and shaft seal replacement, but there is a proof problem. I reached no finding regarding what caused the December 3 flood event or what caused the seal to fail. The absence of these findings means liability for ECI's pre-termination costs related to the December 3 flood event cannot be allocated to Bradshaw. My finding that poorly consolidated concrete caused the November 7 flood event would justify allocating a portion of ECI's claimed pre-termination costs to Bradshaw. But the trial record includes no evidence permitting a reasonable allocation of ECI's claimed pre-termination costs between the November 7 and December 3 events. Mr. Gentry, for example, did not break the costs out in this way during his testimony. Tr. 977:19–978:25 (Gentry). ECI did not address this type of division in its post-trial submissions. And no admitted exhibit divides these claimed costs in a way that would allow a sensible allocation, either.

31. ECI will be awarded its requested additional microtunneling-related costs in the amount of $2,375,678. These costs are reasonable. ECI reasonably solicited bids from subcontractors. Failing to find an adequate subcontractor, ECI reasonably decided to self-perform. And ECI reasonably performed its microtunneling drive. It is reasonably

debatable whether ECI should recover its additional microtunneling-related costs during the 137-day period (in Mr. Gentry's Period 2.4) when the MTBM became stuck and ECI and Akkerman were attempting to retrieve it. I have decided to award the amounts Mr. Gentry calculated for this period because the weight of the evidence shows that ECI and Akkerman acted reasonably throughout their microtunneling drive. Bradshaw did not show that ECI's microtunneling drive was performed negligently in any respect. Indeed, Mr. Bradshaw's contemporaneous opinion was that the microtunneling drive could not be completed. There is another problem. Even if this period were removed from Mr. Gentry's overall calculation of microtunneling-related costs, Bradshaw has not identified record evidence showing a corresponding amount to deduct from ECI's calculation. *See* Tr. 1617:7–1618:6 (Egan). Regardless, I am persuaded by Mr. Egan's testimony that the credit Akkerman issued to ECI is best accounted for by applying it equally across all invoices, meaning ECI's claimed additional microtunneling-related costs should be reduced by $561,000.

32. ECI will be awarded its extended general conditions in the amount of $1,246,168. Mr. Gentry's description of the grounds and methodology on which he based this request are reasonable.

33. ECI will not be awarded its requested amount representing overhead and profit. Mr. Gentry testified that, while the Project would have recovered some overhead, it would not have resulted in profit to ECI as it was originally bid, and Mr. Gentry acknowledged that ECI bid the Project not intending to make a profit on the work. Tr.

1058:18–1059:9 (Gentry). And I am persuaded by Mr. Egan's testimony that it is more appropriate to exclude this amount. *See* Tr. 1607:22–1608:9 (Egan).

34. ECI will be awarded its requested "City of Minneapolis Damages," which include liquidated damages and additional invoices, in the amount of $2,047,411. Bradshaw's challenges to this amount are not persuasive.

a. Bradshaw argues that ECI's liquidated damages are speculative. "[T]here can be no recovery for damages which are remote, conjectural, or speculative." *Hinz v. Neuroscience, Inc.*, 538 F.3d 979, 984 (8th Cir. 2008) (alteration in original) (quoting *Jensen v. Duluth Area YMCA*, 688 N.W.2d 574, 579 (Minn. Ct. App. 2004)). This case is somewhat unusual in that ECI has not paid liquidated damages. P-761. Regardless, the City has a right to impose liquidated damages. And Bradshaw is obligated to indemnify ECI for its share of liquidated damages. Bradshaw has not cited any case where a court rejected an indemnification claim under analogous circumstances, and the trial record gives no reason to think that the City's assessment is a ruse or ungenuine.

b. Bradshaw argues ECI is precluded from recovering liquidated damages because the City failed to provide timely notice to ECI according to the claims process in the General Conditions. *See* Bradshaw's Proposed Findings ¶¶ 624–29. The Supplementary Conditions addressed liquidated damages and gave the City "the right to deduct the liquidated damages from any money in its hands, otherwise due, or to become due, to [ECI], or to initiate applicable dispute resolution procedures and to recover liquidated damages for nonperformance of this Contract

within the time stipulated." J-4 § 18.09. Central to Bradshaw's argument is § 12.01 of the General Conditions:

> 12.01 *Claims*
>
> A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
>
> 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
>
> 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
>
> 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
>
> B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

J-1 at 87 § 12.01. The first question is whether the reference to "applicable dispute resolution procedures" in section 18.09 of the Supplementary Conditions is intended to refer specifically to section 12.01 of the General Conditions. I think not. The phrase "applicable dispute resolution procedures" is quite general and is most naturally understood as referring to an array of available procedures, including litigation in a state or federal court, to the extent not precluded under the contract documents. If section 18.09 of the Supplementary Conditions were intended to cross-reference section 12.01 of the General Conditions, then one would ordinarily expect to see an explicit reference to that subsection, if not by section number, then by the subsection's title. And section 18.09's self-help remedy seems quite inconsistent with the procedures described in section 12.01 of the General

Conditions, suggesting section 18.09 is a standalone provision. There is a second issue. If section 18.09 of the Supplementary Conditions were intended to refer to section 12.01 of the General Conditions, why couldn't ECI have waived its right to enforce the thirty-day deadline? Contracting parties often waive rights, for many reasons. No record evidence here suggests that such a waiver—if that's what ECI did—might have been unreasonable. And Bradshaw has identified no authority supporting the idea that a waiver under any circumstances would preclude ECI as a matter of law from obtaining recovery of liquidated damages demanded by the City.

c. Bradshaw argues that ECI cannot recover liquidated damages and actual damages. As the Minnesota Supreme Court has explained, ordinarily, "[t]here cannot be both liquidated damages and compensatory damages." *Frank v. Jansen*, 226 N.W.2d 739, 744 (Minn. 1975). Fair enough. But ECI is not recovering liquidated damages under a liquidated-damages provision between Bradshaw and ECI. No such provision exists in the Subcontract. Rather, Bradshaw agreed to indemnify ECI for liquidated damages caused by Bradshaw. That's different. Bradshaw cites no case forbidding recovery in similar circumstances. And this result makes practical sense. ECI owes liquidated damages to the City because of Bradshaw's breach. It also suffered actual delay-related damages from the breach. If ECI were limited to recovering actual damages or being indemnified against the City's assessed liquidated damages (caused by Bradshaw), then ECI would not be made whole.

ECI's Indemnity Claim

35. "In the contractual context, a claim based on an express indemnification provision is a legal, rather than equitable, claim, and the remedies for breach are usually monetary in nature." *Johnson v. Johnson*, 902 N.W.2d 79, 85 (Minn. Ct. App. 2017). "An indemnity agreement is a contract, which is to be construed according to the principles generally applied in the construction or interpretation of other contracts." *Buchwald v. Univ. of Minn.*, 573 N.W.2d 723, 726 (Minn. Ct. App. 1998). "An indemnity contract is 'to be given a fair construction that will accomplish its stated purpose.'" *In re RFC & RESCAP Liquidating Tr. Action*, 332 F. Supp. 3d 1101, 1129 (D. Minn. 2018) (quoting *Sorenson v. Safety Flate, Inc.*, 235 N.W.2d 848, 852 (Minn. 1975)). The threshold question is evaluating whether the facts of the case fit within the scope of the indemnification provision. *Id.* at 1129–30; *see also Art Goebel, Inc. v. N. Suburban Agencies, Inc.*, 567 N.W.2d 511, 515 (Minn. 1997).

36. Paragraph 6 of the Subcontract reads in relevant part as follows:

> 6. **Indemnification.** [Bradshaw] will defend, indemnify and save harmless [ECI] and [the City], and their respective officers, directors and agents, to the fullest extent of the law, from any and all claims, damages, and expenses, in whole or in part, including costs, expert fees, and reasonable attorney's fees, bodily injury or property damage, arising or in any way resulting from:
>
> . . .
>
> ii. Subcontractor Acts. Intentional or reckless misconduct, omissions, or negligent acts by [Bradshaw] or its agents, employees, subcontractors and others for whom [Bradshaw] is responsible; third party claims arising from [Bradshaw's] breach of any term of this Agreement;

> . . .
>
> v. *Liquidated Damages*. Any other liability to [the City] or [ECI] that [Bradshaw] caused including Liquidated Damages;
>
> . . . .
>
> Except for claims or damages where [ECI] or [the City] are named additional insureds, [Bradshaw's] liability will be limited to the extent it shows the proportionate share of damage that it caused.

37. Paragraph 6(ii) only requires Bradshaw to indemnify ECI for expenses arising out of Bradshaw's "[i]ntentional or reckless misconduct, omissions, or negligent acts." J-7 ¶ 6. ECI has not proved that it was harmed by Bradshaw's intentional or reckless misconduct. It did not point to any specific act or omission as reckless or intentional at trial. Nor has it attempted to do so in its proposed findings. Similarly, it did not attempt to prove negligence at trial. Although Dr. McGinn and Mr. Hirner opined on what caused Bradshaw's microtunneling drive to fail, neither opined that Bradshaw breached an industry standard of care. Accordingly, I decline to find that Bradshaw is required to indemnify ECI under the plain language of paragraph 6(ii).

38. However, Bradshaw is required to indemnify ECI under paragraph 6(v) of the Subcontract. The City assessed liquidated damages against ECI. And ECI proved that liquidated damages were caused by Bradshaw's unsuccessful microtunneling drive. Under the plain language of the paragraph 6 and subparagraph 6(v), ECI is entitled to recover liquidated damages caused by Bradshaw and expenses, including costs, expert fees, and reasonable attorney's fees arising or in any way resulting from those liquidated damages.

ECI's Claim on Bond

39. ECI's claims against Travelers were bifurcated, to be resolved after a decision on all claims between ECI and Bradshaw. ECF No. 480 at 1–2. Therefore, no decision will be made on this claim at this time. Although it's not obvious what is left to decide, ECI's proposed findings hint at legal disputes regarding Travelers' liability that were not addressed in Bradshaw's proposed findings. *See* ECF No. 530 at 6 n.1; ECF No. 531 ¶¶ 103–08.

Bradshaw's Wrongful Termination Claim

40. "A provision in a contract for the termination thereof upon certain conditions can be enforced only in strict compliance with the terms of those conditions." *Blaine Econ. Dev. Auth.*, 520 N.W.2d at 476 (quoting *Indianhead Truck Line, Inc. v. Hvidsten Transp., Inc.*, 128 N.W.2d 334, 343 (Minn. 1964)).

41. "[ECI] may terminate or suspend [Bradshaw's] Work, all or in part . . . upon [Bradshaw's] material breach . . . ." J-7 ¶ 9. Having concluded that Bradshaw was in material breach under paragraph 9 of the Subcontract, ECI's termination complied with the contract conditions and was not wrongful.

Bradshaw's Breach of Warranty Claims

42. "To establish a warranty claim the plaintiff must basically prove: the existence of a warranty, a breach, and a causal link between the breach and the alleged harm." *Peterson v. Bendix Home Sys., Inc.*, 318 N.W.2d 50, 52–53 (Minn. 1982); *see also* 3 Bruner & O'Connor Construction Law § 9:91 (Nov. 2024 Update) ("[T]he [Supreme] Court recognized that the contractor's right to recovery for the owner's breach of its

implied warranty of the adequacy of design was conditioned upon the contractor's reasonable reliance upon the owner's defective design in preparing its bid and in doing the work.").

43. "[W]here one party furnishes specifications and plans for a contractor to follow in a construction job, he thereby impliedly warrants their sufficiency for the purposes implicit therein and whether the builder has been damaged in proceeding with the work in reliance on such an implied warranty or whether he was damaged in relying on the warranty in making his bid, he may recover." *McCree & Co. v. State,* 91 N.W.2d 713, 724 (Minn. 1958).

44. By providing the plans and specifications, ECI warranted that the plans and specifications were "adequate, fit, and suitable for their intended purpose." *Granite Re, Inc. v. City of La Crescent*, No. 08-cv-441 (RHK/RLE), 2009 WL 2982642, at *8 (D. Minn. Sept. 11, 2009). "The presence of a clause requiring a contractor bidding on the contract to inspect the site does not vitiate an implied warranty." *Fosston Plumbing v. City of Argyle*, No. CX-89-2284, 1990 WL 152706, at *2 (Minn. Ct. App. Oct. 16, 1990); *see Zontelli & Sons, Inc. v. City of Nashwauk*, 373 N.W.2d 744, 754 (Minn. 1985) ("[A] contractor is entitled to rely on the plans and specifications furnished by the owner and has no duty to investigate independently.").

45. "When a construction contract contains a changed-conditions clause, it has been construed to create an implied warranty that the contract can be performed in accordance with the contract specifications." *Fosston Plumbing*, 1990 WL 152706, at *1.

46. "Minnesota law does not expressly require control over contractor 'means and methods' for an implied warranty to be established." *Granite Re*, 2009 WL 2982642, at *8.

47. "If the contractor is required to perform extra work due to the owner's breach of this implied warranty, the contractor is entitled to damages." *Ryan Contracting, Inc. v. City of Shakopee*, No. C2-97-1286, 1998 WL 101350, at *5 (Minn. Ct. App. Mar. 10, 1998).

Karstic Conditions

48. Bradshaw contends that the plans and specifications were deficient because it encountered karstic conditions that were not set forth in the Data Report or Baseline Report.

49. Having concluded that Bradshaw did not encounter karstic conditions, the plans and specifications were not deficient as to this subsurface condition. Because Bradshaw failed to prove that the provided subsurface information in the Data Report and Baseline Report was incorrect, there was no breach of implied warranty.

Groundwater Conditions

50. The Baseline Report describes 50 gallons per minute steady state and 200 gallons per minute flush flow *at the heading*. *See* J-2 at 21 tbl.8-2. The tunnel heading is at the cutterhead face. Tr. 743:21–23 (Hirner). These numbers are based on assumptions of a certain sized opening at the tunnel heading through a bulkhead. Tr. 746:20–747:2 (Hirner).

51. Although Bradshaw estimated high water inflows during the two flood events and during its flow test, the Baseline Report did not warrant how much water would come through a leak in the launch shaft. Therefore, Bradshaw's estimates of groundwater inflows during the two flood events do not demonstrate that the groundwater inflows were higher than warranted.

52. Even if groundwater inflows were greater than warranted, Bradshaw has not proved causation. Microtunneling is a closed system, which means no groundwater inflow should enter during a microtunneling operation. Tr. 729:19–730:3 (Hirner). Here, the groundwater inflows only impacted Bradshaw's work during the first and second flood events. And the Baseline Report clearly conveyed that St. Peter Sandstone is permeable. Bradshaw did not prove by a preponderance of the evidence that the flood events would not have happened but for the higher-than-expected groundwater inflows—*i.e.*, that the leak in the headwall and seal could have been controlled if the groundwater inflow was as warranted by the Baseline Report.

53. Finally, Bradshaw did not identify any specific damages linked to this claim. Mr. Egan prepared three expert reports in this matter: (1) a report analyzing the damages associated with Bradshaw's counterclaims for wrongful termination and breach of contract; (2) a report responding to the opinions of ECI's damages expert, Mr. Gentry; and (3) a rebuttal report addressing Mr. Gentry's criticisms of Mr. Egan's opening report. Tr. 1571:6–12, 1571:16–21, 1572:19–21 (Egan). At trial Mr. Egan did not tether any of Bradshaw's damages to the first or second flood events. Nor did Bradshaw offer any other evidence specifically linked to its groundwater-breach-of-warranty claim. Bradshaw did

not introduce evidence, for example, as to the price of equipment damaged by the flooding events.

Launch Shaft

54. Bradshaw claims that ECI's launch shaft breached an implied warranty in several ways. Bradshaw asserts that (1) ECI chose a method of shaft construction that was not included in the Project Manual; (2) ECI failed to install the portal steel frame and cut an extra lattice girder; and (3) ECI warranted that it would provide a watertight shaft as required in the Contract Documents. Take each in turn.

55. The Project Manual specified three approved methods of shaft construction: drilled steel casing, *see* J-1 at 425–27; secant pile wall, *see id.* at 427–31; and slurry diaphragm wall, *see id.* at 431–35. ECI built the shaft through ground-freezing and shotcrete. Tr. 232:5–234:4 (Johnson); 825:25–826:11 (Hirner).

56. Paragraph 4(i) of the Subcontract forecloses any breach-of-warranty claim regarding the method of shaft construction. Although ECI used a different type of shaft than called for by the Project's specifications, Bradshaw was aware of this and failed to object before beginning its work. Therefore, it accepted the form of ECI's shaft as fit and proper.

57. Even if Bradshaw had not waived a claim regarding the method of shaft construction, it has not explained how the method of shaft construction caused it harm, let alone linked the construction method to specific damages.

58. Paragraph 4(i) also forecloses any breach-of-warranty claim premised on the omission of the portal steel and incomplete state of the shotcrete shaft wall at the tunnel

entrance. And I previously found that the omission of the portal steel and two cut lattice girders did not cause the first flood event. Therefore, Bradshaw failed to prove that this breach caused specific harm.

59. Finally, Bradshaw seeks breach of warranty for ECI's failure to build a watertight shaft. This claim is presumably based on the first flood event (November 7). But as previously explained, Bradshaw is estopped from recovering damages from its own misconduct; here, the defective construction of the headwall that allowed water to enter the shaft.

60. And even if Bradshaw proved that ECI breached a warranty by failing to provide a waterproof shaft, Bradshaw has not identified any specific damages linked to the first flood event.

Bradshaw's Prompt Payment Claim

61. Count 3 of Bradshaw's Counterclaim alleges a violation of Minnesota's Prompt Payment Laws. The claim is based on Minnesota Statutes section 337.10(3). *See* ECF No. 93 ¶¶ 94–95.

62. Minnesota Statutes section 337.10 requires general contractors to "promptly pay any subcontractor within ten days" for its "undisputed services." Minn. Stat. § 337.10, subdiv. 3; *see Jay Tody Constr., LLC v. Schlegel*, No. A22-0894, 2023 WL 1770136, at *2 (Minn. Ct. App. Feb. 6, 2023) ("Minnesota Statutes section 337.10, subdivision 3 (2022), requires the general contractor to promptly pay subcontractors and mandates an award of attorney fees to the prevailing party in a dispute arising out of a general contractor's failure to pay." (footnotes omitted)).

63. To prevail on its claim, Bradshaw must prove it "requested payment from [ECI] for undisputed services, and that [ECI] failed to pay [Bradshaw] for the undisputed services within ten days of receiving payment." *Meyer Contracting, Inc. v. Fowler*, No. A18-0785, 2019 WL 2494782, at *2 (Minn. Ct. App. June 17, 2019). "Under the plain language of Minn. Stat. § 337.10, subd. 3, it is not sufficient that there is no dispute that the subcontractor provided services—in this matter, the supplying of geotextile fabric—the services themselves must be undisputed." *Id.* at *3.

64. The Subcontract tracks section 337.10's prompt-payment requirement:

> [Bradshaw] will apply for payment of completed work. [ECI] then will include in its periodic pay estimates to [the City] the value of [Bradshaw's] completed Work, and, unless [Bradshaw] is in material breach, pay [Bradshaw] owed amounts within ten (10) days of receipt of payment for such Work or the pro rata share paid by [the City], not including Withholding or Retainage.

J-7 ¶ 3(b).

65. Withholding is described as follows:

> *Withholding*. [ECI] may withhold from payment(s) for any deductions or claims caused by [Bradshaw]. The withholding will not be more one hundred fifty percent (150%) of the deduction or estimated claims' cost to fix, expenses, attorney's fees, and other damages. [ECI] will notify [Bradshaw] of a withholding or joint check.

J-7 ¶ 3(b)(i).

66. On November 20, 2019, Bradshaw submitted a payment application in the amount of $972,124.07. D-517 at 1; Tr. 308:25–310:24 (Johnson). Most of this payment application was associated with invoices from Bradshaw's Permalok pipe supplier, totaling

$921,949.51. D-517 at 4, 6. The total amount for the pipe, less 5% retainage, was $875,852.03. The remainder ($96,272.04) was for Bradshaw's payment on performance and payment bonds. *Id.*; *see* Tr. 309:18–310:5 (Johnson). No evidence shows ECI disputed that Bradshaw paid in full for the pipe or for the bonds.

67. Resolving this dispute first requires interpreting the meaning of "undisputed services" as used in section 337.10. I conclude the phrase does not refer to all services provided by a contractor, as ECI seems to argue, but instead refers specifically to the services or work for which the payment is consideration. *See United Riggers & Erectors, Inc. v. Coast Iron & Steel Co.*, 416 P.3d 792, 793 (Cal. 2018) ("The dispute exception excuses payment only when a good faith dispute exists over a statutory or contractual precondition to that payment, such as the adequacy of the construction work for which the payment is consideration."); *see also Pitman Farms v. Kuehl Poultry, LLC*, 48 F.4th 866, 883 (8th Cir. 2022) (remedial statutes should be interpreted broadly).

68. So construed, the answer to just the statutory aspect of Bradshaw's prompt-payment claim is straightforward. ECI never disputed that Bradshaw paid in full for the Permalok pipe or for the bonds at issue. But ECI underpaid for the pipe by $29,387.63 and paid nothing for the bond premium. P-149. ECI's failure to pay these amounts violated Minnesota Statutes section 337.10.

69. Perhaps as a defense to liability under section 337.10, ECI argues that it had a right to withhold payments under the Subcontract paragraph 3(b)(i). The withholding provision, however, required that ECI "notify" Bradshaw. J-7 ¶ 3(b)(i). (In its proposed findings, ECI did not include this notice clause in its quotation of paragraph 3(b)(i). *See*

ECF No. 520 ¶ 6.) ECI also argues that the Subcontract does not require payment when Bradshaw is in material breach, but the Subcontract's prompt-payment requirement in paragraph 3(b) is plainly subject to the withholding provision in paragraph 3(b)(i), along with its notice requirement.

Bradshaw's Bond Claim

70. Bradshaw introduced no evidence at trial regarding its bond claim against ECI and its sureties, Fidelity and Deposit Company of Maryland and Zurich American Insurance Company. Bradshaw's asserted justification for its decision not to present evidence at trial on this claim was that it believed both ECI and Bradshaw's bond claims had been bifurcated for adjudication following completion of trial on the claims between ECI and Bradshaw. Tr. 1736:21–1737:21.

71. Bradshaw's understanding that its bond claim had been bifurcated is not correct. Bradshaw initially filed a motion "to bifurcate the claims pending against [it and its surety, Travelers,] pursuant to Fed. R. Civ. P. 42 to be heard in separate trials because the claims against Bradshaw are to be tried to the bench and the claims against Travelers are not." ECF No. 381 at 1. That motion was denied because of pending dispositive motions. ECF No. 386. Bradshaw then renewed its request. ECF No. 420. As described in its memorandum, Bradshaw requested "that the matters be bifurcated, such that the claims between Bradshaw and ECI are tried separate from, and prior to, the claims between Travelers and ECI." ECF No. 421 at 2. There was no discussion in Bradshaw's memorandum about its bond claim.

72. And the order granting bifurcation only addressed ECI's bond claim. *See* ECF No. 480 at 2 ("So, if granted, Bradshaw and Travelers' bifurcation request would mean that ECI's claims against Travelers would be tried to a jury, if at all, after a decision on all claims between ECI and Bradshaw."); ("[I]t would be considerably more efficient to resolve the claims between ECI and Bradshaw first because ECI's claims against Travelers are derivative of Bradshaw's liability (if any) to ECI.").

73. If there were an insuperable legal bar to trying Bradshaw's bond claim before me (including, for example, if the claim were required to be tried before a jury), Bradshaw has not identified it.

74. Bradshaw presented no evidence at trial with respect to its bond claim. For this reason, Bradshaw's bond claim fails.

ORDER

Based on the foregoing, and on all the files, records, and proceedings herein, **IT IS ORDERED THAT**:

1. Defendant Bradshaw Construction Corporation's motion to correct mistakes in the record [ECF No. 523] is **GRANTED**.
2. Judgment will be awarded in favor of Plaintiff Engineering & Construction Innovations, Inc., on its breach-of-contract claim against Defendant Bradshaw Construction Corporation in the amount of $5,669,257.
3. Judgment will be awarded in favor of Plaintiff Engineering & Construction Innovations, Inc., on its failure-to-indemnify claim against Defendant Bradshaw Construction Corporation for liquidated damages in the amount of $2,047,411,

to the extent not duplicative of breach-of-contract damages, plus expenses, including costs, expert fees, and reasonable attorneys' fees arising or in any way resulting from this liquidated-damages amount.

4. Judgment will be awarded in favor of Plaintiff Engineering & Construction Innovations, Inc., on the claims of Defendant Bradshaw Construction Corporation for wrongful termination, breach of warranty, and claim on bond.

5. Judgment will be awarded in favor of Defendant Bradshaw Construction Corporation on its claim for prompt payment under Minnesota Statutes section 337.10 in the requested amount of $102,674.47, plus interest and attorneys' fees arising from this amount.

6. Plaintiff Engineering & Construction Innovations, Inc.'s motion for judgment as a matter of law [ECF No. 516] is **GRANTED in part** and **DENIED in part**. The motion is **GRANTED** as to the claim on bond of Defendant Bradshaw Construction Corporation. The motion is in all other respects **DENIED**.

7. The parties shall propose a joint schedule identifying remaining issues to be adjudicated and deadlines to govern the parties' submission of briefs and other materials addressing these remaining issues. The joint schedule shall be filed on or before December 19, 2024.

Dated: December 9, 2024

s/ Eric C. Tostrud
Eric C. Tostrud
United States District Court